AR TARGET SHEET

The following document was too large to scan as one unit, therefore, it has been broken down into sections.

EDMC#: 0057146
SECTION: 3 of 3

DOCUMENT #:

TITLE: Dangerous Waste Portion of RCRA Permit for TSD of Dangerous Waste, Hanford WTP Draft Permit, Volumes 1 and 2

Appendix 4A

Engineering Figures

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APPENDIX 4A

ENGINEERING FIGURES

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Citing national security concerns, the US Department of Energy requested that topographic maps and site plot plans not be distributed in electronic form. They are available for viewing at the following public information repositories.

Public Information Repositories

Portland
Portland State University
Branford Price Millar Library
934 SW Harrison and Park
Portland, Oregon 97207
(503) 725-3690
E-mail: bowman@lib.pdx.edu

Richland
USDOE Public Reading Room
2770 University Drive
Consolidated Information Center, Rm. 101L
Richland, Washington 99352
(509) 372-7443
E-mail: reading_room@pnl.gov

Spokane
Gonzaga University
Foley Center
East 502 Boone
Spokane, Washington 99258
(509) 323-3839

Seattle
University of Washington Suzzallo Library
Government Publications Division
Seattle, Washington 98195
(206) 543-4664
Attn: Eleanor Chase
E-mail: echase@u.washington.edu
Public Service: (206) 543-1937

Administrative Record

Richland
Public Access Room
2440 Stevens Center, Room 1101
P.O. Box 950, Mail Stop H6-08
Richland, WA 99352
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Chapter 6.0

Procedures to Prevent Hazards

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CHAPTER 6.0
PROCEDURES TO PREVENT HAZARDS

Contents

Appendix

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6.0 PROCEDURES TO PREVENT HAZARDS [F]

This chapter addresses hazard prevention at the River Protection Project - Waste Treatment Plant (WTP). It covers the following topics: security; preparedness and prevention requirements; preventive procedures, structures, and equipment; and prevention of reaction of the ignitable, reactive, and incompatible waste at the WTP.

Information is presented in two formats: narrative and table. See Appendix 6A for inspection tables.

6.1 SECURITY [F-1]

This section describes WTP security procedures and equipment. Hanford Site security measures are discussed in the *Hanford Facility Dangerous Waste Permit Application, General Information Portion* (DOE-RL 1998).

6.1.1 Security Procedures and Equipment [F-1a]

The following sections describe the barrier and warning signs that support security and control access to the WTP.

6.1.1.1 24-Hour Surveillance System

The entire Hanford Site is a controlled-access area. For surveillance information, refer to the *Hanford Facility Dangerous Waste Permit Application, General Information Portion* (DOE-RL 1998).

6.1.1.2 Barrier and Means to Control Entry

The WTP will use two fences, one around the facility's perimeter, and a second inner fence that controls access to dangerous waste management areas. The inner fence will be of sufficient height and construction to prevent people, livestock, and wildlife accidental access to the WTP. Vehicle access to the WTP administration building will be through a normally open gate in the perimeter fence. Visitors must check in at the administration building and will be escorted as required.

WTP personnel entry to the process areas will be through a controlled pedestrian gate. Service vehicles delivering supplies will enter process areas through a controlled gate. See the topographic map in Chapter 2.0 of this Dangerous Waste Permit Application (DWPA), for further information regarding barriers and vehicular access.

6.1.1.3 Warning Signs [F-1a(2)]

Warning signs, written in English, stating, "DANGER - UNAUTHORIZED PERSONNEL KEEP OUT" (or an equivalent legend), legible from a distance of at least 25 feet, and visible from any angle of approach to the WTP. These warning signs will be posted in locations such as:

- Around the perimeter of the WTP fenced areas
- On each entrance, gate, and other access points to portions of the WTP facility actively managing dangerous waste
- On entrances to other enclosed areas within the plant that contain dangerous or mixed waste

Points of access into waste handling and storage areas will have clearly marked warnings for radiation exposure and corrosivity, the major health risks associated with the waste. Access points into these areas will be strictly controlled. In addition, signs will be posted at the main site access entrance, instructing visitors to report to the WTP administration building to gain access to the WTP (WAC 173-303-310(2)(a)).

6.1.2 Waiver [F-1b]

No waivers of the security procedures and equipment requirements for the WTP are requested.

6.2 INSPECTION PLAN [F-2]

The following sections describe the WTP dangerous waste inspection plan. The WTP will use a graded approach to preventing and detecting malfunctions, deterioration, operator errors, and discharges that will range from daily inspections to integrity assessments. This graded approach is comprised of activities that, at a minimum, will meet the inspection requirements and will include more precautions for equipment at higher risk of failure. Monitoring via instrumentation will be used to perform remote inspections in areas of high radioactivity, including the pretreatment areas, the LAW vitrification area, and the HLW vitrification area. Due to the radioactive nature of the waste and consistent with ALARA principles, monitoring by instrumentation will be the primary means of fulfilling the inspection requirements in these areas. The WTP also will use cameras, windows, process control, function checks, and preventive maintenance to comply with inspection requirements.

Example inspection schedules, which are part of the inspection plan, are presented as tables in Appendix 6A. Each table addresses a particular dangerous waste management unit, or group of units, such as tanks. Within each management unit table, the inspections are presented by system, and are further broken down by individual component in each system.

6.2.1 General Inspection Requirements [F-2a]

This section describes general, WTP-wide inspection requirements used to help prevent, detect, or respond to environmental or human health hazards related to dangerous waste handling, treatment, and storage at the WTP. The inspection schedules are provided in Table 6A-1.

Instruments, such as those used for overfill detection, will be connected to the Process Control System (PCS). The PCS will be the computer system that continuously monitors the instruments' data. Should the PCS detect an abnormal reading, control personnel will be alerted (in real time) by alarm in the control room. The monitoring system will provide trending of selected monitoring data, graphics, and equipment summary displays. The WTP will use a maintenance management system to plan and track preventive maintenance activities and

function testing at the WTP. Other methods of performing inspections at the WTP will be visual where safe and effective to do so.

6.2.1.1 Items to be Inspected [F2a(1)]

The WTP inspection plan will include specific inspection schedules that meet the requirements. In Appendix 6A are example inspection schedules of the types of items to be inspected. The following are listed in the inspection schedule tables:

- General inspections for safety and emergency equipment, security, and preparedness and prevention
- Tank systems
- Containers
- Container storage areas
- Miscellaneous treatment units
- Containment building areas

6.2.1.2 Types of Problems to Look for During Inspections [F-2a(2)]

The example inspection tables in Appendix 6A include a column titled "inspections". This column specifies the type of inspection activities to be performed (such as verifying the operability of equipment and problems to look for) for each inspected item.

6.2.1.3 Frequency of Inspections [F-2a(3)]

In the example inspection tables in Appendix 6A, the column titled "frequency" provides the frequency of inspection for each item. Inspection frequencies were developed using a graded approach that will be finalized prior to the start of operations, and are based on the following:

- Regulatory requirements where specified
- Rate of possible deterioration of equipment
- Probability of a release to the environment
- Potential to cause harm to human health and the environment
- Manufacturer's specifications
- Integrity assessments of tank systems
- Operating experience and knowledge

6.2.1.4 Schedule Location [F-2a(4)]

Controlled copies of the inspection plan will be kept at the WTP facility. The project document control manager, or equivalent, will be responsible for ensuring that controlled copies of the inspection plan are kept current when revisions to the inspection plan are made.

6.2.1.5 Employee Positions Responsible for Conducting Inspections [F-2a(5)]

Personnel performing dangerous waste inspections will have the appropriate facility-specific training, as defined in the *River Protection Project - Waste Treatment Plant Dangerous Waste Training Plan* (Chapter 8.0). The training program will identify the individuals qualified to perform dangerous waste-related inspections. There will not be specific job positions where all individuals holding that position qualify to perform dangerous waste inspections.

6.2.2 Inspection Log [F-2b]

Hand written records of inspections (the inspection log) will include the date and time of inspection; the legible, printed name and hand written signature of the inspector; a notation of the observations made; and an account of spills or discharges. Most of the daily inspections will be recorded as part of the process control data recording system and will therefore be fully retrievable and auditable. Repairs, and remedial or corrective actions needed, will become part of the WTP's corrective action system and the date and nature of repairs or remedial actions taken will be recorded in the inspection log. The inspection log will be stored in the WTP operating record for at least 5 years from the date of inspection.

Electronic media, rather than hard copies, will be used for recording inspections in the WTP, where it is sensible, cost-effective, and/or consistent with ALARA practices. Electronic inspection records normally will be readily retrievable. Whenever possible, dangerous waste inspection requirements will be incorporated into the procedures and operating documentation records for normal operations. The procedures and operating requirements that satisfy compliance with WAC 173-303 (including inspection requirements) will be identified so that they are distinguishable within the larger universe of facility operational requirements.

6.2.3 Schedule for Remedial Action for Problems Revealed [F-2c]

Remedial action will be taken as soon as practicable by facility management to implement the *River Protection Project-Waste Treatment Plant Emergency Response Plan* (ERP) (Chapter 7.0), if an inspection identifies an imminent hazard to human health or the environment.

An investigation will begin within 24 hours, upon detection of unplanned release in the plant. Depending upon the volume of the release and the characterization of the released contents, the cleanup may be completed within 24 hours, or as soon as practicable, after completion of the initial investigation period. However, the time required to cleanup the release will depend on factors such as analytical turnaround time, radioactivity, and volume.

When inspections reveal problems that do not present an immediate threat to human health or the environment, nor result in a release of hazardous material (cracks in secondary containment coatings, nonfunctioning instrumentation, and labeling errors or omissions), such inspection findings will be logged and response actions scheduled and tracked within 24 hours as corrective actions. The following steps are used, in general, to resolve corrective actions:

- Problem identification and documentation

- Classification
- Cause analysis
- Corrective action
- Follow-up investigation

Non-emergency corrective actions will be completed within 24 hours if possible; however, additional response time may be required because of the radioactive component of the waste being managed at the WTP.

The precise title of the personnel that will be responsible for authorizing such corrective actions has not been decided; however, the position will be one equivalent to a shift operations manager.

6.2.4 Specific Process or Waste Type Inspection Requirements [F-2d]

The following sections describe specific process inspection requirements.

6.2.4.1 Container Inspections [F-2d(1)]

The WTP will store immobilized low-activity waste (ILAW), immobilized high-level waste (IHLW), and secondary dangerous and mixed waste in containers. Secondary waste refers to newly generated waste (or a waste by-product from treating the Hanford tank waste) that designates as dangerous waste or mixed waste. Secondary waste also will be generated by the laboratory activities, from maintenance waste, and failed contaminated equipment. The location and design description of the containers and their storage areas are included in Chapter 4. Inspections of container storage areas will be performed weekly when waste is in the storage areas. Table 6A-2 provides examples of container and container storage area inspection schedules for ILAW, IHLW, and secondary waste.

Immobilized Low-Activity and High-Level Waste Containers

Filled ILAW and IHLW containers will be radioactive and thus, inspections must be performed remotely. Therefore, in lieu of conventional container inspections while the containers are in storage, each container will be inspected before and after filling, and when it is moved into and out of the ILAW and IHLW container storage areas. The canisters will not contain free liquids, will be chemically and physically stable (not ignitable or reactive), and will be welded closed. The IHLW containers will be placed in special racks inside the storage areas that will prevent them from toppling. The immobilized waste containers and storage areas are described in Chapter 4.

The WTP will inspect the ILAW and IHLW container storage areas, when they are in use, weekly by remote means. These remotely managed storage areas do not include thirty-inch aisle spacing. The example inspection schedules (Appendix 6A) specify the problems for which to look and how inspections are performed.

The dangerous waste container labeling requirements will be met by using a unique alphanumeric identifier that will be welded to each container. Deterioration of the identifier is

not expected due to the permanent nature of these markings and provisions for subsequent handling that will safeguard against damage to the containers and the identifying marks.

Using the identification on each container, a tracking system will record key movements of each immobilized waste container through the facility. Information about the waste canister tracking system is in Chapter 4. For each container of ILAW and IHLW produced, the system will track the following:

- The location of each container in process and storage areas
- The date that waste was first placed in the container
- The date the container was shipped from the facility, and its destination
- The nature of waste in the container, including dangerous waste designation codes, and land disposal restriction requirements

Secondary and Miscellaneous Waste in Containers

Example inspection schedules for secondary dangerous waste and mixed waste container storage areas are given in Table 6A-2.

6.2.4.2 Tank Systems Inspections and Corrective Actions [F-2d(2)(a)]

A description of the tank systems, and their safety and interlock controls, at the WTP can be found in Chapter 4. Examples of tank system inspections, inspection frequencies, and problems to look for are given in Table 6A-3. Following is a brief discussion of the tank system inspections.

Inspection procedures and the complete inspection schedule will be available at the WTP prior to starting operation. Each tank, or grouping of identical tanks, is shown as a line item in the inspection schedule tables. Each inspection item includes a description of problems to look for, and the frequency of inspection.

Cathodic Protection

Cathodic protection systems will be used to prevent or mitigate metal corrosion on underground dangerous waste transfer lines where the outermost pipes are in contact with the soil. The cathodic protection systems are described in Chapter 4. Example inspection schedules for cathodic protection systems and sources of impressed current are in Table 6A-4.

Tank Integrity Assessments

A periodic integrity assessment approach will be developed for the WTP waste tanks to ensure that the tanks' systems remain fit-for-use. The schedule for performing periodic integrity assessments will be developed during the new tank design assessment discussed in Attachment 51, Appendices 8.10, 9.10, 10.10., and 11.10 of this application.

6.2.4.3 Tank Systems – Corrective Actions [F-2d(2)(b)]

Operating procedures describing corrective actions will be developed prior to operations.

6.2.4.4 Storage of Ignitable or Reactive Wastes [F-2d(3)]

Dangerous waste codes assigned to the waste in the *Double-Shell Tank System Dangerous Waste Part A Permit Application* (DOE-RL 1996) apply to the waste feed the WTP will receive. The waste feed will include the waste codes for ignitability (D001) and reactivity (D003), but the waste is not expected to exhibit the characteristics listed in WAC 173-303-090 for these two waste codes. Based on past process knowledge that includes the age, temperature, history, and chemical composition of the waste feed stored in the DST system, the waste codes D001 and D003 will be removed by the WTP. See the Waste Analysis Plan (Appendix 3A of this application) for specific information on the waste codes and their removal.

Consequently, only the waste feed receipt tanks will be inspected for tanks storing ignitable and reactive waste. The remainder of the process tanks will not contain ignitable or reactive waste. Ignitable or reactive secondary waste may be stored in tanks or containers at the WTP. Annual inspections of all areas managing D001 and D003 waste will be conducted by personnel familiar with the Uniform Fire Code, or in the presence of the local, state, or federal fire marshal. Inspections will be entered into the WTP operating record and maintained at the WTP for 5 years (see Table 6A-5 for the inspection schedule for ignitable or reactive wastes).

6.2.4.5 Air Emissions Control and Detection - Inspections, Monitoring, and Corrective Actions (F-2d[4] and [4][a])

Air Emissions from Process Vents (Subpart AA) [F-2d(4)(a)]
The WTP does not use any of the regulated devices or processes listed; therefore, the WTP will not be subject to regulation under Subpart AA (40 CFR 264).

Air Emission Standards for Equipment Leaks (Subpart BB) [F-2d(4)(b)]
WAC 173-303-691 and Subpart BB (40 CFR 264) applies to equipment that contains or contacts hazardous wastes with organic concentrations of at least 10 percent by weight. This provision will not apply to the facility because the WTP will not accept or treat wastes with organic concentrations at or above 10 percent by weight. Compliance with this provision will be documented through analyses of verification samples, as described in the Waste Analysis Plan.

Air Emission Standards for Tanks, Impoundments, and Containers (Subpart CC) [F-2d(4)(c)]
The regulations specified under WAC 173-303-692 and 40 CFR Part 264 Subpart CC, incorporated by reference, do not apply to the WTP mixed waste tank systems and containers. These tanks and containers qualify as waste management units that are "used solely for the management of radioactive dangerous waste in accordance with all applicable regulations under the authority of the Atomic Energy Act and the Nuclear Waste Policy Act" and are excluded under WAC 173-303(1)(b)(vi). Containers or tanks bearing nonradioactive, dangerous waste, such as maintenance and laboratory waste, that are not excluded under WAC 173-303-692(1)(b)(ii) or 40 CFR 264.1082(c), will comply with the container and tank standards specified under 40 CFR part 264 Subpart CC.

6.2.4.6 Miscellaneous Unit Inspections

The WTP melters are miscellaneous units under WAC 173-303-680. Remote inspections and monitoring will be performed by instrumentation that will be supplemented by camera(s) and viewing through shielded windows because of the high levels of radiation in process areas. Inspections will verify the integrity of melter equipment and detect malfunctions, deterioration, leaks, or operator errors that have the potential to release dangerous waste into the facility or the environment. The miscellaneous unit inspection schedule is provided in Table 6A-6.

6.2.4.7 Containment Building Inspection

Containment buildings will be inspected for items listed in Table 6A-7. The WTP containment building example inspection schedules include the requirements from 40 CFR 264 Subpart DD. Example inspection schedules for tank systems and miscellaneous units located within containment buildings are in Tables 6A-3 and Table 6A-7.

6.2.4.8 Waste Pile Inspection [F-2d(5)]

Operation of the WTP does not involve the placement of mixed waste in piles. Therefore, this section is not applicable to the WTP.

6.2.4.9 Surface Impoundment Inspection [F-2d(6)]

Operation of the WTP does not involve the placement of mixed waste in a surface impoundment. Therefore, this section is not applicable to the WTP.

6.2.4.10 Incinerator Inspection [F-2d(7)]

Operation of the WTP does not involve using a waste incinerator. Therefore, this section is not applicable to the WTP.

6.2.4.11 Landfill Inspection [F-2d(8)]

Operation of the WTP does not involve the placement of mixed waste in a landfill. Therefore, this section is not applicable to the WTP.

6.2.4.12 Land Treatment Facility Inspection [F-2d(9)]

Operation of the WTP does not involve the land treatment of mixed waste. Therefore, this section is not applicable to the WTP.

6.3 PREPAREDNESS AND PREVENTION REQUIREMENTS [F-3]

The following sections document the preparedness and prevention measures to be taken at the WTP.

6.3.1 Equipment Requirements [F-3a]

The following sections describe internal and external communications, and emergency equipment required and located at WTP.

6.3.1.1 Internal Communications [F-3a(1)]

The onsite communication system at the WTP provides immediate emergency information to facility personnel, and includes public address and alarm systems. The public address system provides for verbal instruction and communication to WTP personnel. The internal communication system also notifies personnel of the following local or plant-wide alarm-activated emergency situations: building evacuations, fire or explosion, radioactive discharges, and high airborne contamination. The ERP provides additional information on the response activities.

6.3.1.2 External Communications [F-3a(2)]

The WTP is equipped with devices for summoning emergency assistance from the Hanford Fire Department, the Hanford Hazardous Materials Response Team, or local emergency response teams, as necessary. External communication will be via a telephone communication system. Telephones will be available for staff use at numerous locations throughout the facility. Under no circumstances will only one staff member be at the WTP site. In addition, the current Hanford communication system will be utilized as described in the *Hanford Emergency Management Plan* (DOE/RL 1999), Section 5.2.

6.3.1.3 Emergency Equipment [F-3a(3)]

Portable fire extinguishers, fire control equipment, spill control equipment, and decontamination equipment are available to personnel at the WTP. A list of emergency and decontamination equipment is provided in the ERP.

6.3.1.4 Water for Fire Control [F-3a(4)]

The primary water supply for fire protection will be provided from the 200 East Area raw water distribution system. The fire water supply system comprises two water storage tanks designed to National Fire Protection Association (NFPA) 22, *Standard for Water Tanks for Private Fire Protection* (NFPA 1998); and Factory Mutual (FM) Data Sheet 3-2, *Water Tanks for Fire Protection* (FM 2001a). Each water storage tank will be capable of supplying fire-water for a minimum of two hours at the maximum anticipated demand.

The pumping system is being designed to NFPA 20, *Standard for the Installation of Stationary Pumps for Fire Protection* (NFPA 1999a), and Factory Mutual Data Sheet 3-7N, *Stationary Pumps for Fire Protection* (FM 2001b). A fire pump will be installed and connected to each water storage tank. Each pump will be capable of providing the maximum system demand and will be connected to the underground distribution system in a manner that will prevent single failure from disabling both water supplies.

The underground distribution piping and valving will be designed and installed according to NFPA 24, *Standard for Installation of Private Fire Service Mains and Their Appurtenances* (NFPA 1995); and Factory Mutual Data Sheet 3-10, *Installation and Maintenance of Private Fire Service Mains and Their Appurtenances* (FM 2000).

The distribution system in the various buildings and structures are being designed following the various appropriate codes and standards that apply to their specific occupancy. The standards include NFPA 13, *Standard for the Installation of Sprinkler Systems* (NFPA 1999b); NFPA 14, *Standard for the Installation of Standpipe, private Hydrant, and Hose Systems* (NFPA 2000); NFPA 15, *Standard for Water Spray Fixed Systems for Fire Protection* (NFPA 1996); and the appropriate Factory Mutual standards, as required.

6.3.2 Aisle Space Requirement [F-3b]

Sufficient aisle space will be maintained throughout the facility buildings to allow access of personnel and equipment responding to fires, spills, or other emergencies.

Alternate aisle space for IHLW and ILAW container storage area is explained in Chapter 4. Secondary wastes stored in container storage areas will meet the 30-inch minimum aisle space requirement.

6.4 PREVENTIVE PROCEDURES, STRUCTURES, AND EQUIPMENT [F-4]

The following sections describe preventive procedures, structures, and equipment. Refer to Chapter 4 for additional information on feed transfer piping and tank overfill protection structures, equipment, and instrumentation.

6.4.1 Unloading/Loading Operations [F-4a]

Waste feed to be treated at the WTP will be received from the DST system staging tank through a pipeline with secondary containment; leak detection; and cathodic protection, where transfer lines are in contact with the soil. The WTP will not receive waste for treatment in containers.

The filled ILAW and IHLW containers and canisters will be loaded for transport using special shielding and heavy lifting equipment. The immobilized waste will present no hazards from spills, leaks, run-off, or chemical exposures to personnel from the dangerous waste constituents because the waste will be solid (contain no free liquids) and the containers will be permanently sealed.

Containers of secondary waste bound for transport to another TSD will be packaged according to the federal, state, and local regulations in place at the time. (Because the WTP will not begin generating secondary waste for several years, information such as the procedures, structures, and equipment is not yet available.)

6.4.2 Runoff [F-4b]

Waste stored and treated inside the plants can not contact precipitation and therefore, can not contaminate runoff from WTP structures, nor can precipitation enter secondary containment for the process and storage areas within the plants. Additionally, the process condensate vessels located outside the Pretreatment Plant will be surrounded by a concrete berm lined with a protective coating for secondary containment. The secondary containment will collect and hold

leaks and precipitation until the liquid can be removed. There will be no contaminated runoff from the outside tanks.

6.4.3 Contamination of Water Supplies [F-4c]

The active portions of the facility are being designed with robust structural features such as thick, reinforced concrete floors and walls; secondary containment (lined with stainless steel or other protective coating); and off-gas treatment systems. The structural features alone are designed to prevent waste feed from contacting the environment. Operation of the WTP is also intended to prevent a release of waste to the environment. The WTP design, construction, and operation will prevent waste feed and secondary waste from contaminating groundwater and drinking water supplies (see Chapter 4 for structural design information).

Raw and potable water will be supplied to the WTP via separate underground lines from the 200 East Area water treatment and distribution system. Backflow preventers or interconnection breaks ensure that in the event water is contaminated at the WTP, the water cannot flow back into the water systems' sources. There will be no connections between potable water and raw water systems, or between the potable water system and piping that will contain mixed waste.

6.4.4 Equipment and Power Failures [F-4d]

Should there be a partial or total loss of electrical power to the WTP, automatic measures ensure the plant is in a safe operational configuration. (Safe operational configuration is defined as a shutdown to minimal operations that will prevent releases and prevent unnecessary damage to the equipment.)

The emergency power system will consist of three 4.16kV medium voltage, automatically controlled emergency diesel generators connected to three separate 4.16kV emergency switchgears. Upon loss of power the emergency power system generators will automatically start. The emergency diesel generators are capable of starting, accelerating, and being loaded with the design load in a specified time limit (under 10 seconds per National Electrical Code (NEC) article 700 [Sec 3.2.2 (7)][NFPA 1999c]). The emergency power system will be connected to essential loads in order to ensure only a short-term power interruption for those loads designated as essential.

Standby power will be provided by three 13.8kV medium voltage, standby diesel generators. The standby diesel generators are started manually or automatically in the event of a prolonged loss of offsite power. This source is primarily associated with the LAW and HLW melters. Critical indications and controls are backed up by uninterruptible power supplies and batteries. The plant will remain in a safe condition during loss of electrical power.

Egress lighting will consist of self-contained fixtures with battery packs and charging systems. These lighting systems will be located in stairways, exit routes and fire alarm stations and will come on automatically upon loss of normal power to the fixture. A selected part of the normal lighting will operate as essential lighting, and will provide a minimum level of illumination throughout the plant to aid in restoring the plant to normal operation. Essential lighting will be

powered by the emergency power system and will be available after an offsite power loss, following a delay required to start the emergency power supply diesel generators and for the generators to pick up the essential loads.

Selected instrumentation and controls will be unaffected by a loss of offsite power, since many of these instruments and controls will be powered by uninterruptible power supply systems. The uninterruptible power supply systems will be battery backed, and the battery chargers will be connected to the emergency power supply. Emergency lighting, such as in the central control room, will be connected to an uninterruptible power supply system. Radiation monitoring using continuous air monitors and area radiation monitors are also powered by these systems and continue operating during power failure.

6.4.5 Personal Protection Equipment [F-4e]

Facility design, operating practices, and administrative controls are the primary means of preventing personnel exposure to dangerous and mixed waste. The following practices, structures, and equipment are intended to minimize personnel exposure to chemicals, radioactive contamination, and radiation exposure:

- Remote operation and viewing
- Active ventilation that moves air from uncontaminated zones to progressively more contaminated zones
- Waste cutoff systems that automatically keep operations in a safe condition
- Secondary containment for liquids
- Offices, control rooms, change rooms, and lunchrooms that are situated to minimize casual exposure of personnel

Before the start of an operation that might expose employees to the risk of injury or illness, a review of the operation will be performed to ensure the appropriate protective gear is selected. Personnel will be instructed to wear personal protective equipment in accordance with training, posting, and instructions. The inspection schedule for personal protective equipment is found in Table 6A-1; however, the specific items listed as personal protective equipment will be in the ERP (Chapter 7.0) and not duplicated here.

6.4.6 Prevent Releases to the Atmosphere [WAC 173-303-806(4)(a)(viii)(F)]

The WTP off-gas treatment systems are the primary means of preventing contaminated releases to the atmosphere. The procedures, structures, and equipment used in these systems will be described in Chapter 4.

6.5 PREVENTION OF REACTION OF IGNITABLE, REACTIVE, AND/OR INCOMPATIBLE WASTE [F-5]

The WTP will receive waste feed that is designated as ignitable or reactive; the WTP may store, in containers, secondary waste that is designated as ignitable, reactive, or incompatible (see Chapter 3 and Waste Analysis Plan, Appendix 3A of this application).

Process knowledge, administrative controls, and the active ventilation system prevent the formation or release of ignitable vapors that could harm human health or the environment.

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Appendix 6A

Inspection Schedules

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APPENDIX 6A
INSPECTION SCHEDULES

Contents

Tables

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INSPECTION SCHEDULES

This section provides example WTP inspection schedules showing inspection frequencies and what to look for. These example inspection schedules list the monitoring equipment, safety and emergency equipment, security devices, preparedness and prevention equipment, and operating and structural equipment that help prevent, detect, or respond to environmental or human health hazards related to mixed and dangerous waste. A copy of the current and complete inspection schedules will be retained at the WTP or other approved locations.

Table 6A-1 contains examples of the general inspection requirements. The remaining tables are organized by type of waste management unit. Following is a list of tables and their locations included in this Appendix.

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Table 6A-1 Example WTP General Inspection Schedule

Component Name	Inspection	Frequency
Security Devices		
WTP inner fence	Check for damaged fencing	Monthly
Posted warning signs (see Section 6.1.1.3) that say: "DANGER – UNAUTHORIZED PERSONNEL KEEP OUT" (or equivalent)	Verify signs are present, legible, and visible; ensure buildings or rooms containing dangerous or mixed waste are posted	Monthly
Points of access to active portions turnstiles, doors, and/or magnetic encoded bar readers	Verify operability	Monthly
Emergency Preparedness Equipment		
Safety showers and eyewash stations	Verify operability and sufficient pressure	Weekly
Automatic fire suppression system(s)	Verify operability	Annually
Portable fire extinguishers (all types)	Check for adequate charge	Monthly
Emergency lighting	Test operability	Monthly
Spill kit and spill control equipment	Verify contents complete	Quarterly
Emergency sirens and alarms	Verify operability	Monthly
Voice paging system (pagers or PA system)	Verify operability	Monthly
Crash alarm telephone system	Verify operability	Monthly
Emergency telephones	Verify operability	Monthly
Personal protective clothing and equipment	Ensure supplies meet ERP listing and requirements	Quarterly
Power Supply Inspections		
Emergency uninterruptible power supply system(s)	Verify operability	Annual
Emergency diesel generator	Perform no-load test and verify sufficient fuel	Annual

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Table 6A-2 Example Container and Container Storage Area Inspection Schedules

Name	Inspection	Frequency
Dangerous and/or Mixed Waste Container Storage Areas		
• HLW Vit Plant container storage areas Nos. 1, 2 & 3 • LAW Vit Plant container storage area • Non-rad dangerous waste container storage area • Central waste container storage area • HLW Out-of-Service Melters • LAW Out-of-Service Melters	Verify major risk labels present and legible, ensure all containers closed (except when waste is being added to container); Check that container storage areas are free of liquid and debris; Check for significant cracks, gaps, and other signs of deterioration of storage area floors; Verify minimum 30 inches of aisle space between containers rows; Ensure that any containers holding free liquids have portable secondary containment and no liquids accumulated in portable secondary containment	Weekly
Immobilized HLW and LAW Containers		
Empty containers (canisters) for immobilized LAW and HLW waste)	Inspect container for liquid or debris inside, cracks, dents, bulges, gouges, or other abnormalities	Prior to filling
Filled IHLW and ILAW containers (canisters)	Inspect (by camera surveillance or cell window) each container for cracks, leaks, bulges, or other abnormalities	After sealing container
	Record in tracking system each container's location when placed in storage; Record in tracking system all container location changes if container(s) are moved while in storage; Verify container in recorded location when transporting container out of WTP storage	Within 48 ho of placing or moving each container
HLW and LAW Vitrification Plants' Container Storage Areas		
IHLW and ILAW container storage areas	Visually check for liquid, foreign material, or debris in storage area; Check for deformities in storage area floors	Weekly when facility is storing waste in immobilized waste container storage area
ILAW buffer container storage area	Visually check (camera surveillance or other remote means) for damaged containers; Check for liquids, foreign materials or debris in storage area; Check for cracks and deformities in storage area	Weekly when facility is storing waste

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Table 6A-3 Example Tank Systems Inspection Schedule

2

Component Name	Plant item number	Inspection	Frequency
Pretreatment Plant Tank System			
FRP			
Waste feed receipt vessels	V11020A, V11020B, V11020C, V11020D	Inspect tank level monitoring data to prevent overflow	Daily
FEP			
Evaporator feed vessels	V11001A, V11001B	Inspect tank level monitoring data to prevent overflow	Daily
Waste feed evaporator separator vessels	V11002A, V11002B	Inspect tank level monitoring data to prevent overflow	Daily
Evaporator process condensate pot	V11005	Inspect tank level monitoring data to prevent overflow	Daily
HLP			
Strontium/transuranic lag storage vessels	V12001A, V12001C,	Inspect tank level monitoring data to prevent overflow	Daily
Lag storage vessels	V12001D, V12001E	Inspect tank level monitoring data to prevent overflow	Daily
HLW feed blending vessel	V12007	Inspect tank level monitoring data to prevent overflow	Daily
UFP			
Evaporator concentrate buffer vessels	V12010A & V12010B	Inspect tank level monitoring data to prevent overflow	Daily
Ultrafiltration feed vessels	V12011A & V12011B	Inspect tank level monitoring data to prevent overflow	Daily
LAW permeate hold vessels	V12015A, V12015B, V12015C	Inspect tank level monitoring data to prevent overflow	Daily
Ultrafilters	G12002A, G12002B, G12003A, G12003B, G12004A, G12004B	Inspect tank level monitoring data to prevent overflow	Daily

Component Name	Plant item number	Inspection	Frequency
CXP			
LAW feed vessel	V13001	Inspect tank level monitoring data to prevent overflow	Daily
Cesium ion exchange columns	C13001, C13002, C13003, C13004	Inspect column monitoring data to prevent release	Daily
Caustic rinse collection vessel	V13008	Inspect tank level monitoring data to prevent overflow	Daily
CNP			
Recovered nitric acid vessel	V13028	Inspect tank level monitoring data to prevent overflow	Daily
Eluate contingency storage vessel	V13073	Inspect tank level monitoring data to prevent overflow	Daily
Cesium concentrate lute pot	V13030	Inspect tank level monitoring data to prevent overflow	Daily
PVP			
HEME drain collection vessels	V15326 & V15327	Inspect tank level monitoring data to prevent overflow	Daily
Condensate collection vessel	V15038	Inspect tank level monitoring data to prevent overflow	Daily
Vessel vent header collection vessel	V15052	Inspect tank level monitoring data to prevent overflow	Daily
PWD			
Primary alkaline effluent vessel	V45013	Inspect tank level monitoring data to prevent overflow	Daily
Secondary alkaline effluent vessel	V45018	Inspect tank level monitoring data to prevent overflow	Daily
Ultimate overflow vessel	V15009B	Inspect tank level monitoring data to prevent overflow	Daily
Plant wash vessel	V15009A	Inspect tank level monitoring data to prevent overflow	Daily

Component Name	Plant item number	Inspection	Frequency
Acidic effluent vessel	V15013	Inspect tank level monitoring data to prevent overflow	Daily
Contaminated effluent vessel	V15018	Inspect tank level monitoring data to prevent overflow	Daily
HLW effluent transfer vessel	V12002	Inspect tank level monitoring data to prevent overflow	Daily
C3 floor drains tank	V15319	Inspect tank level monitoring data to prevent overflow	Daily
TLP			
Evaporator separator vessel	V41011	Inspect tank level monitoring data to prevent overflow	Daily
Process condensate hold vessel	V41013	Inspect tank level monitoring data to prevent overflow	Daily
Plant wash vessels	V45009A & V45009B	Inspect tank level monitoring data to prevent overflow	Daily
TCP			
LAW buffer storage vessel	V41001	Inspect tank level monitoring data to prevent overflow	Daily
RDP			
Spent resin collection vessels	V43135A & V43135B	Inspect tank level monitoring data to prevent overflow	Daily
Resin flush collection vessel	V43136	Inspect tank level monitoring data to prevent overflow	Daily
TXP			
Technetium ion exchange columns	C43006, C43007, C43008, C43009	Inspect column monitoring data to prevent overflow	Daily
Caustic rinse collection vessel	V43056	Inspect tank level monitoring data to prevent overflow	Daily
Technetium ion exchange buffer vessel	V43001	Inspect vessel level monitoring data to prevent overflow	Daily

Component Name	Plant item number	Inspection	Frequency
Treated LAW buffer vessels	V43110A, V43110B, V43110C	Inspect tank level monitoring data to prevent overflow	Daily
TEP			
Technetium eluant recovery evaporator	V43069	Inspect tank level monitoring data to prevent overflow	Daily
Recovered technetium eluant vessel	V43071	Inspect tank level monitoring data to prevent overflow	Daily
Technetium concentrate lute pot	V43072	Inspect tank level monitoring data to prevent overflow	Daily
RLD			
Process condensate vessels	V45028A & V45028B	Inspect tank level monitoring data to prevent overflow	Daily
LAW Vitrification Plant Tank System			
LCP			
Melter 1 concentrate receipt vessel	V21001	Inspect tank level monitoring data to prevent overflow	Daily
Melter 2 concentrate receipt vessel	V21002	Inspect tank level monitoring data to prevent overflow	Daily
Melter 3 concentrate receipt vessel	V21003	Inspect tank level monitoring data to prevent overflow	Daily
LFP			
Melter 1 feed preparation vessel	V21101	Inspect tank level monitoring data to prevent overflow	Daily
Melter 1 feed vessel	V21102	Inspect tank level monitoring data to prevent overflow	Daily
Melter 2 feed preparation vessel	V21201	Inspect tank level monitoring data to prevent overflow	Daily
Melter 2 feed vessel	V21202	Inspect tank level monitoring data to prevent overflow	Daily
Melter 3 feed preparation vessel	V21301	Inspect tank level monitoring data to prevent overflow	Daily

Component Name	Plant item number	Inspection	Frequency
Melter 3 feed vessel	V21302	Inspect tank level monitoring data to prevent overflow	Daily
LVP			
LAW caustic scrubber blowdown vessel	V22001	Inspect tank level monitoring data to prevent overflow	Daily
LOP			
Melter 1 SBS condensate vessel	V22101	Inspect tank level monitoring data to prevent overflow	Daily
Melter 2 SBS condensate vessel	V22201	Inspect tank level monitoring data to prevent overflow	Daily
Melter 3 SBS condensate vessel	V22301	Inspect tank level monitoring data to prevent overflow	Daily
RLD			
Plant wash vessel	V25001	Inspect tank level monitoring data to prevent overflow	Daily
LAW C3/C5 effluent collection vessel	V25002	Inspect tank level monitoring data to prevent overflow	Daily
SBS condensate collection vessel	V25003	Inspect tank level monitoring data to prevent overflow	Daily
HLW Vitrification Plant Tank System			
HCP			
Concentrate receipt vessel 1	V31001	Inspect tank level monitoring data to prevent overflow	Daily
Concentrate receipt vessel 2	V31002	Inspect tank level monitoring data to prevent overflow	Daily
HOP			
SBS condensate collection vessel	V32101	Inspect tank level monitoring data to prevent overflow	Daily
HDH			
Canister decontamination vessel	V33001	Inspect tank level monitoring data to prevent overflow	Daily

Component Name	Plant item number	Inspection	Frequency
Waste neutralization vessel	V33002	Inspect tank level monitoring data to prevent overflow	Daily
Canister bogie decontamination vessel	V33004	Inspect tank level monitoring data to prevent overflow	Daily
RLD			
Acidic waste vessel	V35002	Inspect tank level monitoring data to prevent overflow	Daily
Plant wash and drains vessel	V35003	Inspect tank level monitoring data to prevent overflow	Daily
Decontamination effluent collection vessel	V35009	Inspect tank level monitoring data to prevent overflow	Daily
Offgas drains collection vessel	V35038	Inspect tank level monitoring data to prevent overflow	Daily
HFP			
Feed preparation vessel	V31101	Inspect tank level monitoring data to prevent overflow	Daily
HLW melter feed vessel	V31102	Inspect tank level monitoring data to prevent overflow	Daily
Analytical Laboratory Tank System			
LAB			
Lab liquid effluent collection vessels	V60001a & V60001b	Inspect tank level monitoring data to prevent overflow	Daily
Plant Sumps as identified in Chapter 4: Leak Detection for Primary Containment			
Leak detectors located in secondary containment for all tank systems, container storage areas, miscellaneous units, and containment buildings managing dangerous and/or mixed waste	Monitor cell leak detection instrumentation or monitoring data to detect leaks	Daily	
Underground Piping (receiving from DST and transferring out)			
Leak detectors	Monitor cell leak detection instrumentation or monitoring data to detect leaks	Daily	

1

Table 6A-4 Example Cathodic Protection Inspection Schedule-Dangerous Waste Transfer Lines

Component Name and Line Number	Inspection	Frequency
Cathodic protection systems for dangerous and mixed waste transfer lines	Verify proper operation	• Initial (less than 6 months after installation) • Annually (from date of initial installation inspection, above)
All sources of impressed current supporting cathodically protected dangerous and mixed waste transfer lines	Test for proper function	Bi-monthly

Table 6A-5 Example Ignitable or Reactive Wastes Inspection Schedule

Component Name	Inspection	Frequency
Receipt tanks	Inspect, by qualified personnel or in the presence of fire marshal, for compliance with Uniform Fire Code and enter inspection into operating record	365 days
Containers and container storage areas storing ignitable or reactive waste	Inspect, by professional person or in the presence of fire marshal for compliance with Uniform Fire Code and enter inspection into operating record. Inspect containers and container storage areas for compliance with WAC 173-303-630(8) requirements.	365 days

Table 6A-6 Example Miscellaneous Unit Inspection Schedule

Component Name	Inspection	Frequency
LAW & HLW Melters	• Visual inspection (via cave window or CCTV if provided) for damage, leaks, or abnormalities • Inspect melter level monitoring data to prevent overflow	Daily

Table 6A-7 Example Containment Buildings Inspection Schedule

Component Name	Inspection	Frequency
• Containment building areas as designated in Chapter 4	• Visual of area surrounding containment building to detect signs of releases of hazardous waste • Primary barrier in low or no radiation zones – look for significant cracks, gaps, corrosion or other signs of deterioration, look for liquid on floor. • High radiation areas – check differential pressure monitoring records to ensure negative pressure in containment building area	Weekly

Chapter 7.0

Contingency Plan

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CHAPTER 7.0
CONTINGENCY PLAN

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7.0 CONTINGENCY PLAN [G]

The contingency plan requirements provided in Washington Administrative Code (WAC) 173-303-350, *Contingency Plan and Emergency Procedures*, are satisfied in portions of the following documents:

- *River Protection Project - Waste Treatment Plant (RPP-WTP) Emergency Response Plan* (Appendix 7A of this document)
- *Hanford Emergency Management Plan* (DOE-RL 1999)(Attachment 4 of the *Dangerous Waste portion of the Resource Conservation and Recovery Act (RCRA) Permit for the Treatment, Storage, and Disposal of Dangerous Waste*)(Ecology 1994a)

The *RPP-WTP Emergency Response Plan* also serves to satisfy a broad range of other requirements (e.g., *Occupational Safety and Health Administration Standards* [29 CFR 1910], *Toxic Substance Control Act of 1976* [40 CFR 761], and United States Department of Energy Orders). Therefore, revisions made to portions of this contingency plan document that are not governed by the requirements of WAC 173-303 will not be considered as a modification subject to WAC 173-303-830 or Hanford Facility RCRA Permit (Dangerous Waste Portion), Condition I.C.3.

Table 7-1 identifies which portions of the *RPP-WTP Emergency Response Plan* are written to meet WAC 173-303 contingency plan requirements. In addition to the *RPP-WTP Emergency Response Plan* portions identified in Table 7-1, Section 12.0 of the *RPP-WTP Emergency Response Plan* is written to meet WAC 173-303 requirements identifying where copies of the *Hanford Emergency Management Plan* and the *RPP-WTP Emergency Response Plan* are maintained on the Hanford Facility. Therefore, revisions to Section 12.0 and the portions identified in Table 7-1 are considered a modification subject to WAC 173-303-830 or Hanford Facility RCRA Permit (Dangerous Waste Portion), Condition I.C.3.

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Table 7-1 Hanford Facility Documents Containing Contingency Plan Requirements of WAC 173-303-350(3)

1

Requirement	Hanford Emergency Management Plan (DOE/RL-94-02): Attachment 4 of the Hanford Facility RCRA Permit (Dangerous Waste Portion)	RPP-WTP Emergency Response Plan[1]
-350(3)(a) – A description of the actions which facility personnel must take to comply with this section and WAC 173-303-360.	X[2] Section 1.3.4	X[2] Sections 7.1, 7.2 through 7.2.5, and 7.3[3] Sections 4.0, 8.2, 8.3, 8.4, 11.0
-350(3)(b) – A description of the actions which shall be taken in the event that a dangerous waste shipment, which is damaged or otherwise presents a hazard to the public health and the environment, arrives at the facility, and is not acceptable to the owner or operator, but cannot be transported pursuant to the requirements of WAC 173-303-370(5), Manifest system, reasons for not accepting dangerous waste shipments.	X[2] Section 1.3.4	X[2,4] Section 7.2.5.1
-350(3)(c) – A description of the arrangements agreed to by local police departments, fire departments, hospitals, contractors, and state and local emergency response teams to coordinate emergency services as required in WAC 173-303-340(4).	X Sections 3.2.3, 3.3.1, 3.3.2, 3.4, 3.4.1.1, 3.4.1.2, 3.4.1.3, 3.7, and Table 3-1	
-350(3)(d) – A current list of names, addresses, and phone numbers (office and home) of all persons qualified to act as the emergency coordinator required under WAC 173-303-360(1). Where more than one person is listed, one must be named as primary emergency coordinator, and others must be listed in the order in which they will assume responsibility as alternates. For new facilities only, this list may be provided to the department at the time of facility certification (as required by WAC 173-303-810 (14)(a)(i)), rather than as part of the permit application.		X[5] Section 3.1, 13.0

Requirement	Hanford Emergency Management Plan (DOE/RL-94-02): Attachment 4 of the Hanford Facility RCRA Permit (Dangerous Waste Portion)	RPP-WTP Emergency Response Plan[1]
-350(3)(e) – A list of all emergency equipment at the facility (such as fire extinguishing systems, spill control equipment, communications and alarm systems, and decontamination equipment), where this equipment is required. This list must be kept up to date. In addition, the plan must include the location and a physical description of each item on the list, and a brief outline of its capabilities.	X Hanford Fire Department: Appendix C	X Section 9.0
-350(3)(f) – An evacuation plan for facility personnel where there is a possibility that evacuation could be necessary. This plan must describe the signal(s) to be used to begin evacuation, evacuation routes, and alternate evacuation routes.	X[6] Figure 7-3 and Table 5-1	X[7] Section 1.5

An "X" indicates requirement applies.

[1]Portions of the *Hanford Emergency Management Plan* not enforceable through Appendix A of that document are not made enforceable by reference in the *RPP-WTP Emergency Response Plan*.

[2]The *Hanford Emergency Management Plan* contains descriptions of actions relating to the Hanford Site Emergency Preparedness System. No additional description of actions are required at the Hanford Site level. If other credible scenarios exist or if emergency procedures at the WTP are different, the description of actions contained in the WTP Emergency Response Plan will be used during an event by a building emergency director.

[3]Sections 7.1, 7.2 through 7.2.5, and 7.3 of the building emergency plan are those sections subject to the Class 2 "Changes in emergency procedures (i.e., spill or release response procedures)" described in WAC 173-303-830, Appendix I, Section B.6.a.

[4]This requirement only applies to TSD units that receive shipment of dangerous or mixed waste defined as offsite shipments in accordance with WAC 173-303.

[5]Emergency Coordinator names and home telephone numbers are maintained separately from the contingency plan document, on file in accordance with Hanford Facility RCRA Permit (Dangerous Waste Portion) General Condition II.A.4, and is updated, at a minimum, monthly.

[6]The Hanford Facility (site-wide) signals are provided in this document. No unit/building signal information is required unless unique devices are used at the unit/building.

[7]An evacuation route for the WTP is provided. Evacuation routes for occupied buildings surrounding the WTP are provided through information boards posted within buildings.

Appendix 7A

Emergency Response Plan

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APPENDIX 7A
EMERGENCY RESPONSE PLAN

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1.0 GENERAL INFORMATION

The River Protection Project – Waste Treatment Plant (WTP) will be a dedicated treatment plant that will treat mixed waste transferred from the United States Department of Energy, Richland Operations Office (DOE-RL) Double-Shell Tank System Unit at the Hanford Site. The WTP is located on the Hanford Site, a 560-square-mile (1,450-square kilometer) United States Department of Energy (DOE) site in southeastern Washington State. The WTP is located in the East portion of the 200 Area near the center of the Hanford Site. Figures 7A-1 and 7A-2 show the location of the WTP with respect to the Hanford Site and the 200 East Area of the Hanford Site.

The Hanford Site Emergency Preparedness Program is based on the incident command system that allows a graded approach for response to emergency events. This plan contains a description of WTP facility specific emergency planning and response and is used in conjunction with DOE/RL-94-02, *Hanford Emergency Management Plan*. Response to events is performed using WTP and/or Hanford Site level emergency procedures.

This plan is being issued to meet permitting requirements. This plan will be updated to provide additional necessary information prior to the introduction of bulk quantities of hazardous chemicals into the WTP.

1.1 FACILITY NAME

United States Department of Energy Hanford Site
River Protection Project – Waste Treatment Plant

1.2 FACILITY LOCATION

Benton County, Washington, within the 200 East Area.

Buildings/facilities covered by this plan are:

- Pretreatment plant
- Laboratory
- Low Activity Waste (LAW) vitrification plant
- High Level Waste (HLW) vitrification plant
- Balance of Facilities (e.g., support buildings)

1.3 OWNER

United States Department of Energy
Office of River Protection
P.O. Box 450
Richland, Washington 99352

Facility Manager:

Bechtel National, Inc.
3000 George Washington Way
Richland, Washington 99352

1.4 DESCRIPTION OF THE WTP FACILITY AND OPERATIONS

The WTP will be composed of a pretreatment building that includes the waste receipt tanks, a separate laboratory, two vitrification plants, and an assortment of other support facilities collectively referred to as the Balance of Facility (BOF). Figure 7A-3 shows the layout of the WTP, with the major buildings identified.

The WTP will receive waste from the double-shell tank (DST) system located in the 200 Area of the Hanford Facility. The waste to be treated meets the regulatory definition of "radioactive high level waste" referred to in the Land Disposal Restriction Treatment Standards (40 CFR 268.40). The WTP will pretreat the tank waste by separating the waste into Low Activity Waste (LAW) feed and High Level Waste (HLW) feed. After separating the waste into two feed streams, the waste will be piped to the vitrification plants; LAW vitrification and HLW vitrification. The vitrification process involves mixing waste feed with glass-forming materials, pouring the mixture into a melter, heating until it is liquefied, pouring it into stainless steel containers (called canisters), and then welding on a lid after each canister finishes cooling.

The canisters of immobilized HLW will remain on the Hanford Site until a permanent repository is available. The immobilized LAW, containing relatively small amounts of radioactive material, will be disposed of on the Hanford Site.

The air emissions (off-gas) from the pretreatment and vitrification processes will be treated to ensure safe levels before being released to the atmosphere. Air emissions are regulated by the Washington State Departments of Ecology and Health, and the United States Environmental Protection Agency, and will be treated to a level protective of human health and the environment. The WTP will discharge air emissions through four primary stacks, one each for pretreatment, LAW vitrification, HLW vitrification, and the laboratory.

The WTP will use the following four types of permitted dangerous waste management units:

- Storage in containers
- Treatment and storage in tanks
- Treatment in miscellaneous units (the melters)
- Containment buildings

The locations of these dangerous waste management units are summarized in Table 7A-1.

The buildings used for treating and storing waste will be constructed of reinforced concrete and structural steelwork. Below-grade portions of buildings will be reinforced concrete construction,

and the superstructure will be made of reinforced concrete and structural steelwork with a metal roof. The plant structure will be supported by a reinforced concrete mat foundation.

Except for two outdoor on-ground storage tanks surrounded by a concrete berm for secondary containment, all other tanks and treatment processes managing dangerous waste will be located inside buildings. Container storage areas will be located in buildings or covered storage areas. Where floors and walls provide secondary containment they either will be lined with stainless steel, a protective coating, or a combination of both. The WTP dangerous waste management units will be equipped with leak detection systems and inspected regularly.

The waste and off-gas treatment processes will generate "secondary wastes," such as used equipment, laboratory waste, and other chemically and radiologically contaminated materials. (These "newly generated wastes" also are referred to as "miscellaneous wastes"). Secondary waste either will be transferred elsewhere in the WTP for treatment or transferred to another permitted treatment, storage, or disposal (TSD) facility. Non-radiological dangerous waste may also be generated by laboratory and maintenance activities. Such waste will be managed in containers at the WTP until it can be transferred to a permitted TSD facility.

The three primary processes at the WTP (pretreatment, LAW vitrification, and HLW vitrification) are supported by BOF systems and utilities. The BOF will include support systems and utilities required for the waste treatment processes within the main process areas (pretreatment, LAW vitrification, and HLW vitrification). The BOF support systems and utilities will include, but not be limited to, heating and cooling, process steam, process water, chilled water, and compressed air.

1.5 BUILDING EVACUATION ROUTING

Figure 7A-1 shows evacuation routes for the Hanford Site. Identification of the primary and secondary staging areas, a general layout of the evacuation routes and evacuation routes for each of the primary buildings which comprise the WTP will be provided in a revision of this document before the introduction of bulk quantities of hazardous chemicals into the WTP. These evacuation routes will be placed in Appendix 7A-B. Alternate evacuation routes will be used on a case-by-case basis, based on meteorological conditions at the time of an event.

Figure 7A-1 Location of the WTP on the Hanford Site

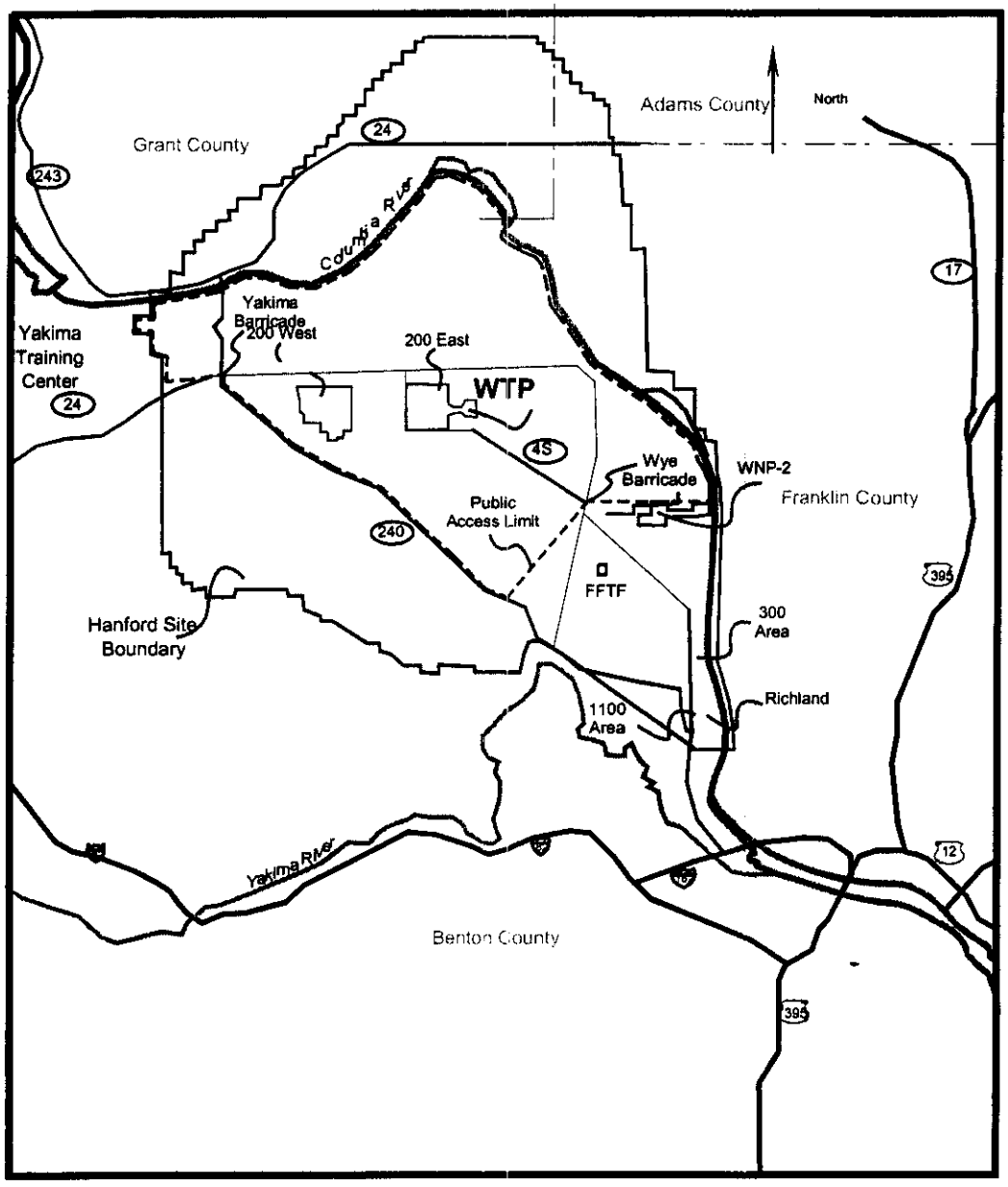

Figure 7A-2 Location of the WTP Within the 200 East Area

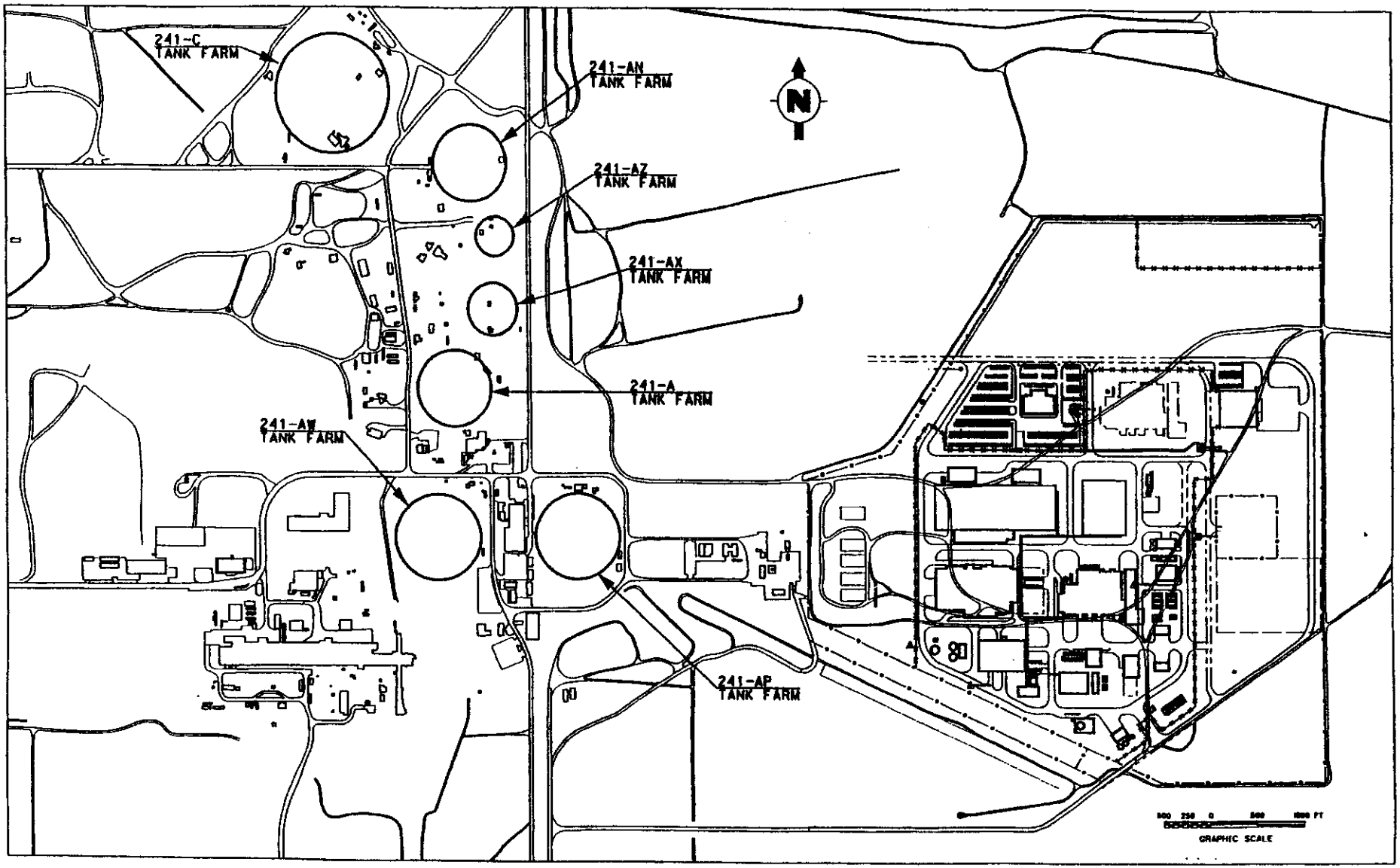

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Figure 7A-3 WTP Site Layout

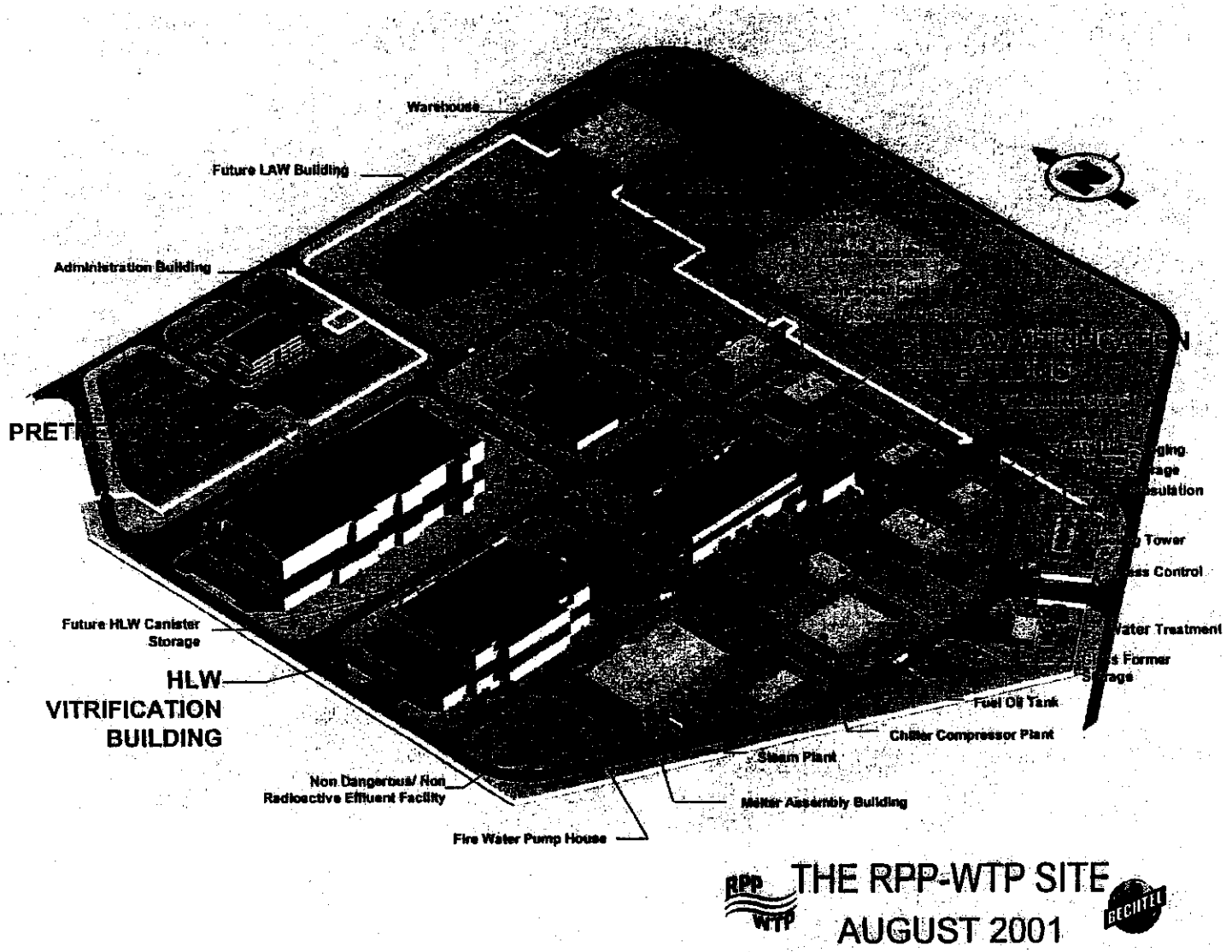

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Table 7A-1 Locations of Dangerous Waste Management Units

Dangerous Waste Management Unit	General Location
Container Storage Areas	Immobilized LAW (ILAW) storage in LAW vitrification building. ILAW Lag Storage building.
	Immobilized HLW (IHLW) storage in HLW vitrification building
	Miscellaneous waste container storage in pretreatment building, LAW vitrification building, HLW vitrification building, and Central Waste Storage Area, Out of Service melter storage areas.
Tank Systems	LAW feed receipt in pretreatment building
	LAW evaporation in pretreatment building
	Entrained solids and Sr/TRU separation in pretreatment building
	Cesium removal in pretreatment building
	Technetium removal in pretreatment building
	LAW intermediate waste storage in pretreatment building
	LAW and glass-formers mixing in LAW vitrification building
	HLW feed receipt in pretreatment building
	HLW ultrafiltration in pretreatment building
	HLW mixing with LAW intermediate waste in pretreatment building
	HLW and glass-formers mixing in HLW vitrification building
Miscellaneous Thermal Treatment Units (melters)	HLW melter (1 used) in HLW vitrification building
	LAW melters (3 used) in LAW vitrification building
Containment Buildings	Pretreatment hot cells, maintenance areas and air filtration areas.
	LAW locally shielded melter gallery, container finishing and C3 workshops.
	HLW melter caves, container finishing, C3 workshops, air filtration areas and drum transfer tunnel.

2
3

2.0 PURPOSE

This plan describes both the facility hazards and the basic responses to upset and/or emergency conditions within the WTP. These events may include spills or releases caused by equipment failure during processing, fires and explosions, transportation activities, movement of materials, packaging, storage of hazardous materials, and natural and security contingencies. When used in conjunction with DOE/RL-94-02, this plan meets the requirements for contingency planning as required by WAC 173-303. Sections 1.5, 3.1, 4.0, 7.1, 7.1.1, 7.1.2, 7.2, 7.2.1, 7.2.2, 7.2.3, 7.2.4, 7.2.5, 7.2.5.1, 7.3, 8.2, 8.3, 8.4, 9.0, 9.1, 9.2, 9.3, 9.4, 9.5, 9.6, 11.0, 12.0, 13.0 of this plan are enforceable sections meeting Resource Conservation and Recovery Act (RCRA) contingency planning requirements. Enforceable sections cannot be changed without coordinating the change with the Hanford Facility RCRA Permit modification process.

3.0 WTP EMERGENCY RESPONSE ORGANIZATION

The WTP Emergency Response Organization (ERO), as described in this section and in Section 2.2 of the *Hanford Emergency Management Plan* (DOE-RL-94-02, 1999), will be available 24 hours each day to respond to events at the plant. The Building Emergency Director (BED) will be prepared to carry out his or her duties immediately and whenever an imminent or actual emergency exists, as required by *Washington Administrative Code* (WAC) 173-303-360 (2)(a), (b), and (c). The *Hanford Emergency Management Plan* (DOE-RL-94-02, 1999), Section 2.2.1, details the responsibilities of the BED. The on-duty Pretreatment shift operations manager will be the designated primary BED. A designated alternate BED will be available on each shift. Other ERO personnel will be on duty with either primary or alternate responsibilities. A BED, Incident Command Post (ICP) Hazards Communicator, ICP Communicator, and a Hazards Assessor (chemical or radiological, or both, depending on the event) will staff the ERO along with various BED support personnel. In addition, the BED will act as the plant operations specialist for the Hanford Fire Department (HFD) personnel.

3.1 BUILDING EMERGENCY DIRECTOR

Emergency response will be directed by the BED until the Incident Commander (IC) arrives. The incident command system (ICS) and staff, with supporting on-call personnel, fulfill the responsibilities of the Emergency Coordinator as discussed in WAC 173-303-360. During events, WTP personnel perform response duties under the direction of the BED. The ICP is managed by either the senior Hanford Fire Department member present or senior Hanford Patrol member present on the scene (security events only). These individuals are designated as the IC and as such, have the authority to request and obtain any resources necessary for protecting people and the environment.

The BED becomes a member of the ICP and functions under the direction of the IC. In this role, the BED continues to manage and direct WTP operations.

A listing of primary and alternate BEDs by title, work location and work telephone number is contained in Section 13.0 of this plan. The BED will be on the premises or will be available through an "on-call" list 24-hours-a-day. Names and home telephone numbers of the BEDs will

be available from the Patrol Operations Center (POC), in accordance with Hanford Facility RCRA Permit, Dangerous Waste Portion, General Condition II.A.4.

3.2 OTHER MEMBERS

As a minimum, facility management appoints and ensures training is provided to individuals to perform as Personnel Accountability Aides and Staging Area Managers. The Personnel Accountability Aides are responsible for facilitating the implementation of protective actions (evacuation or take cover) and for facilitating the accountability of personnel after the protective actions have been implemented. Staging Area Managers are responsible for coordinating and conducting activities at the staging area. In addition, the BED can identify additional support personnel (radiological control, maintenance, engineering, hazardous material coordinators, etc.) to be part of the WTP Emergency Response Organization as necessary.

The complete WTP Emergency Response Organization listing of positions, names, work locations and telephone numbers will be maintained in a separate location in a format determined appropriate by WTP management. Copies will be distributed to appropriate WTP locations and to the Hanford Emergency Operations Center.

4.0 IMPLEMENTATION OF THE PLAN

This plan will be implemented when the BED has determined that a release, fire, or explosion has occurred at the facility or in adjacent site facilities. Actions determined in DOE/RL-94-02 and the requirements of WAC 173-303 will be implemented as described below.

The BED ensures that trained personnel identify the character, source, amount, and aerial extent of the release, fire, or explosion to the extent possible. Identification of waste can be made by activities that can include, but are not limited to: visual inspection of involved containers, sampling activities in the field, reference to inventory records, or by consulting with facility personnel.

Samples of materials involved in an emergency may be taken by qualified personnel and analyzed as appropriate. These activities must be performed with a sense of immediacy and shall include available information.

The BED shall use the following guidelines to determine if an event has met the requirements of WAC 173-303-360(2)(d):

1 The event involved an unplanned spill, release, fire, or explosion,

AND

2 a The unplanned spill or release involved a dangerous waste, or the material involved became a dangerous waste as a result of the event (e.g., product that is not recoverable.), or

2 b The unplanned fire or explosion occurred at the WTP or transportation activity subject to RCRA contingency planning requirements,

AND

3 Time-urgent response from an emergency services organization was required to mitigate the event, or a threat to human health or the environment exists.

As soon as possible, after stabilizing event conditions, the BED shall determine, in consultation with the WTP environmental single-point-of-contact, if notification to Ecology is needed to meet WAC-173-303-360 (2)(d) reporting requirements. If all of the conditions under 1, 2, and 3 are met, notifications are to be made to Ecology. Additional information is found in DOE/RL-94-02, Section 4.2.

If review of all available information does not yield a definitive assessment of the danger posed by the incident, a worst-case condition will be presumed and appropriate protective actions and notifications will be initiated. The BED is responsible for initiating any protective actions based on his best judgment of the incident.

The BED must assess each incident to determine the response necessary to protect the personnel, facility, and the environment. If assistance from Hanford Patrol, Hanford Fire Department, or ambulance units is required, the Hanford Emergency Response Number (911) must be used to contact the POC and request the desired assistance. To request other resources or assistance from outside the WTP, the POC business number is used (509-373-3800).

5.0 FACILITY HAZARDS

Chemical and radiological constituent hazards that could occur at the WTP will be identified and evaluated in the hazards assessment required by the *Hanford Emergency Management Plan* (DOE-RL 94-02 1999), Section 1.3.3.2. The objective of this section is to describe in a general manner the hazards that pose significant risks to human health or to the environment.

Prior to the implementation of this plan, before the introduction of bulk quantities of hazardous chemicals into the WTP, additional information will be provided in this section. Information to be provided will include the following:

- Updates on chemical and radiological hazards upon completion of the hazards assessment
- Updates based on the Draft Work Plan for Screening Level Risk Assessment for the WTP (BNFL Inc. 1999b)]

5.1 HAZARDOUS MATERIALS

Potentially hazardous materials are used for normal operations, maintenance, and support functions at the WTP. These materials could include acids, caustics, oils, diesel fuel, and solvents.

Material Safety Data Sheets (MSDSs) are provided in the control rooms, storage areas, and operating areas of the WTP.

The following is a representative list of the types of hazardous materials that will be stored and used in the WTP.

Double Shell Tank Solids
Double Shell Tank Supernate
Nitric Acid
Sodium Hydroxide
Sodium Nitrate
Sodium Permanganate
Strontium Nitrate
Solvents
Urea

Safe design of the plant, Job Safety Analysis, Job Control System Work Packages, and MSDSs provide the basis for safe use of the materials in the workplace. Plant procedures and training that address these hazardous materials will be in place before the introduction of bulk chemicals into the plant. Employees who work with or handle hazardous wastes will be trained according to requirements identified in the *River Protection Project – Waste Treatment Plant Dangerous Waste Training Plan* (BNI, 2001a).

5.2 INDUSTRIAL HAZARDS

Industrial hazards associated with the WTP will include electrical equipment, pressurized equipment and systems, high temperature equipment, rotating equipment, confined spaces, forklifts, cranes, lifting operations, and compressed gas cylinders.

Safe design of the plant, Job Safety Analysis, Job Control System Work Packages, and MSDSs provide the basis for the safe use of this equipment in the workplace. Plant procedures that address these hazards will be in place prior to the implementation of this plan. Employees will be trained in the safe use and handling of compressed gas cylinders, cranes, forklifts etc as applicable.

5.3 RADIOACTIVE, DANGEROUS, AND MIXED WASTE

Safe design of the plant, Job Safety Analysis, Job Control System Work Packages, and MSDSs provide the basis for safe handling of radioactive, dangerous, and mixed waste. Plant procedures that address the management of these wastes will be in place prior to operation of the WTP.

Dangerous waste categories treated at the WTP will be identical to the Double-Shell Tank Farms. Categories include characteristic, listed, and state-only wastes, two of which are designated as extremely hazardous waste (WT01 and WP01). The following summarizes the dangerous waste numbers for the WTP.

Characteristic Waste Numbers

D001	D002	D003	D004

D005	D006	D007	D008
D009	D010	D011	D018
D019	D022	D028	D029
D030	D033	D034	D035
D036	D038	D039	D040
D041	D043		
	Listed Waste Numbers		
F001	F002	F003	F004
F005	F039[a]		
	State-only Wastes[b]		
WT01	WT02	WP01	WP02

a Multi-source leachate (F039) is included as a waste derived from non-specific wastes F001 through F005.

b Washington State criteria

The WTP will use the following four types of permitted dangerous waste management units:

- Storage in containers
- Treatment and storage in tanks
- Treatment in miscellaneous units (the melters)
- Containment buildings

Solid Form

Radioactive, dangerous, and mixed wastes will be generated at the WTP during sampling, decontamination, and maintenance activities. This waste will be accumulated in a designated accumulation area(s) and transported to a permitted storage area.

Liquid Form

Highly radioactive mixed waste solutions and slurries will be processed at the WTP and stored in the pretreatment plant, HLW plant, and LAW plant for further treatment. Although these solutions and slurries will contain chemicals that are hazardous, the bounding consequence for spills or releases of this waste is usually based on the radiological components of the waste.

Gaseous Form

Airborne effluent streams will be produced through the following:

- Radiological control area Heating Ventilation Air Conditioning (HVAC) system – exhaust from radiological controlled areas.
- Vessel off-gas systems – vapors and gases from tanks and process equipment including the melters.

The off-gas systems will remove particulate, condensate Nox and organic vapors from the air stream before discharging them to the radiological controlled area HVAC system. The combined air stream will pass through HEPA filtration and will be monitored for radioactivity and chemicals.

5.4 CRITICALITY

Analyses have shown that there is no credible criticality event that can be postulated to occur at the WTP (BNI 2001b).

6.0 POTENTIAL EMERGENCY CONDITIONS

Potential emergency conditions, under both WAC 173-303 and the DOE, may include one of three basic categories: 1) operations (process upsets, fires and explosions, loss of utilities, spills, and releases), 2) natural phenomena (e.g., earthquakes), and 3) security contingencies (bomb threat, hostage situation, etc.). The following are conditions that may lead to an emergency at the WTP. For a summary of responses to emergency conditions see Section 7.2.

The results of the WTP hazards assessment will be used to update the information presented in this section.

6.1 FACILITY OPERATIONS EMERGENCIES

6.1.1 Loss of Utilities

6.1.1.1 Loss of Electrical Power

A loss of electrical power to the WTP is possible. The power will be provided to the WTP from two power transformers, supplied by two independent 230 kV transmission lines. The transformers will deliver a 13.8 kV secondary voltage for internal distribution at the plant. The plant loads will be divided into two load groups, normal, and alternate (Load Groups A and B).

6.1.1.2 Loss of Water

A loss of water, potable, raw or fire suppressant will not likely result in a plant emergency or evacuation of the WTP. Operations may be limited in order to minimize impact from the loss of water. A loss of water to the fire suppression system could result in a plant emergency, if a fire should develop.

6.1.1.3 Loss of Ventilation

A loss of ventilation could cause a change to plant operation and could require local evacuation of personnel if a loss of contamination control is suspected.

6.1.1.4 Loss of Process Air or Instrument Air

A loss of process air or instrument air could cause a change to plant systems but would not require implementation of personnel-protective actions.

6.1.2 Major Process Disruption/Loss of Plant Control

A major process disruption could be caused by a failure of the Process Control System (PCS). A loss of the PCS could cause plant abnormalities that would lead to increased radiological challenges to the WTP's protection systems.

6.1.3 Pressure Release

The WTP will have high-pressure steam and low-pressure compressed air and steam systems. Loss of the compressed air or steam system or systems could result in loss of plant control or a process disruption. Process disruption or loss of plant control could interrupt the treatment processes. However, it is not likely that this event would be classified as an emergency.

Pressurized gases will be used throughout the WTP. Additionally, compressed gas cylinders will be stored in the compressed gas storage area. The inventory of gases includes flammable and nonflammable gases. These gases pose a hazard in the immediate storage area, or in the immediate area of the location being used. Failure of compressed gas bottles could cause flying debris hazards. This condition is addressed in Section 6.1.4.

A process system pressure release is categorized as a condensate spray release. This condition is addressed in Section 6.1.5.

6.1.4 Fire and/or Explosion

A fire or explosion could generate highly toxic or corrosive fumes, or release of radioactive material. Flying debris might result from explosions or compressed gas cylinder failure. Process system disruption, loss of plant control, and breach of process system boundaries could result from the flying debris. In addition, heavy smoke could disrupt the operation of the ventilation system.

6.1.5 Hazardous Material Spill

Prior to the introduction of bulk quantities of hazardous chemicals into the WTP, this plan will be revised to include the types of hazardous materials that will be present, their locations, quantities, and characteristics. Additionally the potential effects from an accidental release of hazardous materials will be discussed.

6.1.6 Dangerous/Mixed Waste Spill

Dangerous waste or mixed waste could spill, due to equipment failure or operator error. The severity of the event would be dependent on the nature and quantity of the spill.

6.1.7 Transportation and /or Packaging Incidents

A transportation or packaging event involving hazardous chemicals, samples or radioactive material could result in personnel exposure to hazardous materials. Potential environmental damage could occur due to the release of hazardous or radioactive materials.

6.1.8 Radiological Waste Release

The WTP processes include large quantities of radioactive liquids and slurries. Radioactive waste could accumulate in various treatment systems. The plant has the potential for concentrating radioactive waste; therefore, responses for abnormal radiation levels and radioactive waste releases are included in the scope of emergency planning. The release could come as a result of either failure of the ventilation system or a catastrophic leak of mixed waste.

The ventilation system is designed to provide an air supply from areas of no contamination potential to areas of high contamination potential. Areas within the WTP are classified into one of three zones, C2, C3 and C5, according to their potential for radioactive contamination, with C5 having the highest potential for radioactive contamination. The C3 and C5 exhaust fans maintain a negative pressure in areas where radioactive contamination is most likely to occur. Failure of the C3 or C5 exhaust fans could cause a reverse flow and cause a release of radioactive contamination.

6.1.9 Criticality

Analyses have shown that there is no credible criticality event that can be postulated to occur at the WTP (BNI 2001b).

6.2 NATURAL PHENOMENA

The WTP is designed such that it will not fail under a design basis event. Therefore, natural phenomena events are not expected to cause structural damage to the WTP, which would constitute an emergency, or cause a release to the environment. However, the following natural phenomena that have the potential to cause conditions which are beyond the facility design basis are discussed: a beyond design basis seismic event, high winds, volcanic eruption and ash fall, a flood, a range fire, and an aircraft crash.

6.2.1 Seismic Event

Depending on the magnitude of the beyond design basis event, severe structural damage can occur resulting in serious injuries or fatalities and the release of hazardous materials to the environment. Damaged electrical circuits and wiring could result in the initiation of fires.

6.2.2 Volcanic Eruption/Ash fall

Though not expected to cause structural damage, the ash resulting from a volcanic eruption could cause shorts in electrical equipment and plug ventilation system filters.

6.2.3 High Winds/Tornadoes

High winds that are defined as sustained winds above a threshold that would potentially or actually cause significant structural damage to the facility, are not expected to occur. (Significant structural damage is interpreted to mean a breach of facility containment/confinement systems sufficient to cause an actual or potential release of hazardous material to the environment). However, dirt and dust from windstorms could cause shorts in

electrical equipment, or could plug ventilation system filters. Disruption of normal operations is possible.

6.2.4 Flood

The 200 Area is well above projected flood elevations for the Columbia and Yakima Rivers; therefore, a flood is not considered a credible natural event for the WTP. The grading and drainage features that are provided ensures that precipitation, even from a downpour, would infiltrate the ground or drain off toward the Columbia River without significant flooding. The WTP is not sited in a wetlands or coastal high-hazard area.

6.2.5 Range Fire

The hazards associated with a range fire are similar to those associated with a building fire plus potential site access restrictions and travel hazards such as poor visibility. Smoke and ash from a range fire can also cause shorts in electrical equipment, or plug ventilation system filters. Disruption of normal operations is possible.

6.2.6 Aircraft Crash

In addition to the potential for serious injuries or fatalities, an aircraft crash could result in the direct release of hazardous materials to the environment or cause a fire that could lead to the release.

6.3 SECURITY CONTINGENCIES

Security contingencies are discussed in the following sections.

6.3.1 Bomb Threat/Explosive Device

A bomb threat may be received by anyone who answers the telephone or receives mail. The major effect on the WTP is that personnel will need to initiate emergency shutdown before evacuation. If an explosive device detonates, the effects are the same as those discussed under fire and explosion.

6.3.2 Hostage Situation/Armed Intruder

A hostage situation or the entry of an armed hostile intruder(s) can pose an emergency if either of these conditions has the potential to adversely affect facility operations. This could result in a loss of facility control or the coercion of an employee to take some malevolent action. The severity of the emergency would be based on actual or potential damage to the WTP or release of hazardous material or radioactive, dangerous, or mixed waste.

6.3.3 Suspicious Object

A suspicious object could result in an explosion. If a suspicious device were to detonate, the effects would be the same as those discussed under fire and explosion. The response to a suspicious device with the potential to contain a bomb would be the same as a bomb threat discussed in Section 6.3.1 above.

7.0 INCIDENT RESPONSE

The initial response to any emergency is to immediately protect the health and safety of persons in the affected area. Identification of released material is essential to determine appropriate protective actions. Containment, treatment, and disposal assessment are secondary responses.

The following sections describe the process for implementing basic protective actions as well as descriptions of response actions for the events listed in Section 6.0 of this plan. DOE/RL-94-02, Section 1.3, provides concept of operations for emergency response on the Hanford Site. Site specific procedures are detailed in DOE-0223 and will be used as necessary. Facility specific actions will be denoted in WTP emergency response procedures. Procedure titles will be included in Appendix 7A-A when the documentation is revised prior to the introduction of bulk quantities of hazardous chemicals into the WTP.

7.1 PROTECTIVE ACTION RESPONSES

Protective action responses are discussed in the following sections. The steps identified in the following description of actions do not have to be performed in sequence because of the unanticipated sequence of incident events.

7.1.1 Evacuation

The WTP may need to be evacuated when conditions warrant (such as fire, explosion, release of hazardous material, etc.). Evacuation will be initiated by automatic alarms or directed by the BED. The evacuation alarm is a steady siren signal. The BED will use WTP emergency response procedures, experience and training to determine when conditions warrant evacuation.

The BED may initiate the evacuation of a building(s) or the entire WTP site with a verbal announcement or by manually initiating an evacuation alarm. The evacuation alarm will be delivered by a combination of the WTP siren system and warning lights. Specific instructions can be provided to personnel via the WTP public address system. As conditions warrant, the 200 Area evacuation alarms will be activated by telephoning the POC, using either 911 (preferred) or 373-3800. The BED will determine if an alternate staging area should be used based on the location of the event, wind direction, and WTP emergency procedures.

The Hanford Site evacuation routes are shown in Figure 7A-B-1, Appendix 7A-B. Evacuation routes out of the buildings will be provided in a revision of this document before the introduction of bulk quantities of hazardous chemicals into the WTP. These routes will be based on providing simple egress. Employees are trained on evacuation routes and procedures. Routes will be clearly marked and maintained clear of all obstructions. The BED will determine the operating configuration of the WTP and identify any additional protective actions needed for limiting exposure of personnel to the hazard.

Staging areas will be designated when the site and building layouts have been finalized. The exterior staging areas will be based on prevailing wind direction (NW), gates, and roadways leading off the site. These locations will be based on historical wind data in the 200 East Area.

Alternate staging areas will be available for use if the wind direction or other circumstances necessitate.

For an immediate evacuation, accountability will be performed at the staging area. Personnel Accountability Aides (PAAs) and Staging Area Managers (SAMs) will ensure evacuation actions are taken at all applicable WTP buildings. These positions are standing assignments. Implementing actions executed by the PAAs and SAMs will be directed by site or plant emergency response procedures. When evacuation actions are complete, the PAAs will report to the SAMs. The Staging Area Managers will report to the BED via radio communications or other means, as necessary. When personnel cannot be accounted for active searches will be conducted. ERO personnel, utilizing personal protective equipment appropriate for the conditions, will conduct these searches.

To evacuate from any WTP building, personnel will proceed to the nearest exit. Stairways, not elevators, will be used to ascend or descend to the main level (0 ft. elevation). From the building, personnel will proceed to the primary staging areas unless otherwise instructed by the BED or other ERO personnel. Personnel in protective clothing when an evacuation alarm sounds will make every effort to follow normal exit procedures when exiting from radiological control areas, unless threatened by the emergency event. Personnel unable to remove protective clothing will remain separated from the others and report to the contaminated personnel staging sign (there will be a sign at each staging area). These personnel will notify staging area personnel that they need a radiation survey.

Personnel will immediately evacuate the building and proceed to the primary staging area (unless directed otherwise by the BED or other ERO personnel), when a fire alarm is heard. The discoverer of the fire will contact the Central Control Room (CCR) via telephone or radio. The BED will make an announcement on the public address system, stating which building has initiated the fire alarm, and inform personnel to stand clear of the area.

The BED may direct personnel to evacuate to an offsite location, if required. Personnel will remove and leave protective clothing in the parking lot and obtain a radiation survey prior to entering a vehicle. Personnel will use their privately owned vehicles. Personnel with their own vehicles will be asked to accommodate other personnel who are without transportation. Government vehicles may be available and may be obtained upon request from the RL Emergency Operations Center (RL-EOC).

7.1.2 Take Cover

The BED will initiate a local take cover notice for the WTP using the facility communications systems. Where area 200 could be affected, the BED will initiate the take cover alarm by telephoning the POC, using either 911 (preferred) or 509-373-3800. The take cover alarm is a wavering siren signal. Actions to complete a take cover order will be directed by WTP emergency response procedure. Determination of additional take cover actions will be based on operating configuration, weather conditions, type and duration of release, and other conditions, as applicable to the event and the associated hazard. The intent of this protective action is to

minimize personnel exposure to hazardous materials and move personnel to locations where additional instructions can be provided.

When the take cover alarm is activated, personnel shall halt work, place equipment in a safe condition, and take cover in the nearest building capable of providing shelter from an airborne hazard. Exterior doors and windows will be closed; and heating, ventilation, and air conditioning (HVAC) systems will be secured. If possible, personnel will follow normal exit procedures from radiological controlled areas in preparation for evacuation. The PAAs have responsibility to ensure that take cover actions are taken. These positions are standing assignments. When take cover actions are complete, the PAAs will provide the BED with a status report via communications paths identified in WTP procedures.

7.2 RESPONSE TO FACILITY OPERATIONS EMERGENCIES

Depending on the severity of the event, the BED reviews the site-wide and WTP emergency response procedure(s) and, as required, categorizes and/or classifies the event. If necessary, the BED initiates area protective actions and Hanford Site Emergency Response Organization activation. The steps identified in the following description of actions do not have to be performed in sequence because of the unanticipated sequence of incident events.

The following emergency signals will be used to initiate emergency response:

- Evacuation - steady siren
- Take Cover - wavering siren
- Fire - Gong/Bell

7.2.1 Loss of Utilities

A case-by-case evaluation is required for each event to determine loss of utility impacts. When a BED determines a loss of utility impact, actions are taken to ensure dangerous and/or mixed waste is being properly managed, to the extent possible given event circumstances. As necessary, the BED will stop operations and take appropriate actions until the utility is restored.

7.2.1.1 Loss of Electrical Power

Should there be a partial or total loss of electrical power to the WTP, automatic measures ensure the plant is in a safe operational configuration. (Safe operational configuration is defined as a shutdown to minimal operations that will prevent releases and prevent unnecessary damage to the equipment.)

The emergency power system (EPS) will consist of three automatically controlled 4.16kV emergency diesel generators (EDGs) connected to three separate 4.16kV emergency switchgear. Upon loss of power, the emergency power system generators will automatically start. The EDGs are capable of starting, accelerating and being loaded with the design load within a short time period (under 10 seconds). The EPS will be connected to essential Important to Safety (ITS)

loads in order to ensure only a short-term power interruption for those loads designated as essential.

Standby power will be provided by three 13.8kV standby diesel generators (SDGs). The SDGs are started manually or automatically in the event of a prolonged loss of offsite power. This source is primarily associated with the LAW and HLW melters. Critical indicators and controls are backed up by un-interruptible power supplies and batteries. The plant will remain in a safe condition during loss of electrical power. Operational response to this event is in accordance with *Loss of Electrical Power* procedures.

Egress lighting will consist of self-contained fixtures with battery packs and charging systems. These lighting systems will be located in stairways, exit routes and fire alarm stations and will come on automatically upon loss of normal power to the fixture. A selected part of the normal lighting will operate as essential lighting, and will provide a minimum level of illumination throughout the plant to aid in restoring the plant to normal operation. Essential lighting will be powered by the EPS and will be available after an offsite power loss, following a delay required to start the emergency power supply diesel generators and for the generators to pick up the essential loads.

Selected instrumentation and controls will also be powered by an un-interruptible power supply (UPS) system and therefore will be unaffected by a loss of offsite power. UPS systems will be battery backed, and the battery chargers will be connected to the EPS. Radiation monitors, such as Continuous Air Monitors (CAMs) and area radiation monitors, are also powered by the UPS systems and continue operating during power failure.

7.2.1.2 Loss of Water

Upon loss of the raw water system, operations will be restricted. Upon loss of potable water chemical operations will be terminated until safety showers and eyewash stations are available. Upon loss of the fire suppression system, the plant will be placed in a safe configuration, and corrective actions will be implemented.

7.2.1.3 Loss of Ventilation

A cascade ventilation system is used at the WTP in conjunction with physical building containment features to confine transferable radioactive contamination in the event of an accidental release, spill, or system failure. The ventilation system is designed to maintain building differential pressures so air will flow from areas of lessor contamination potential to areas of greater contamination potential through containment boundary penetrations such as engineered air gaps and air in-bleed ductwork.

The WTP is divided into numbered zones with the higher number indicating the greater hazard potential and therefore the greater degree of control/restriction required. Radiation (R1 to R5) and contamination (C1 to C5) zones are classified independently in order to differentiate between the need for shielding or confinement.

Supply air in C2 areas flows via C3 to the C5 areas, where it will be discharged by the C5 exhaust fans. In some instances, the airflow will flow from the C2 areas to the C3 areas, where it will be discharged by the C3 exhaust fans. Some C2 air flow will be directly exhausted. Upon loss of the ventilation system, restoration of the C3 and C5 exhaust fans will be immediately attempted. If the C3 and C5 exhaust fans cannot be restored immediately, the C2 supply fans are automatically stopped, and personnel may be notified to evacuate C3 areas, as a precautionary measure.

The BED and either the ERO or the IC will take the following actions:

- Locate the source of the problem, and take steps necessary to control the event
- Ensure appropriate areas have been evacuated
- Monitor contamination levels in the plant
- Restore ventilation system

7.2.1.4 Loss of Process or Instrument Air

The process air system will use redundant air compressors. One will be in operation and the other(s) will be in autostart mode. If the standby compressor fails to start on loss of the operating compressor, a backup compressor will be started locally.

7.2.2 Major Process Disruption/Loss of Plant Control

If there is a major process disruption, the BED will be notified while an attempt is made to return the system to service. The BED will compare the situation to criteria provided in the facility categorization/classification procedure to determine if an Operational Emergency is occurring. If it is determined that an Operational Emergency is in progress, the BED will make the appropriate categorization/classification, initiate protective actions, begin the notification process, and request that the ERO be activated. The system condition will be assessed, and mitigative/corrective actions will be implemented.

7.2.3 Pressure Release

Pressure hazards in plant buildings associated with pressurized gases or compressed gas bottles could require changes to the plant operation and may require local evacuation. A fire or explosion caused by a release of pressurized gas will be responded to in accordance with Section 7.2.4. If a mixed waste release occurs, actions identified in Section 7.2.5 will be performed.

7.2.4 Fire and/or Explosion

In the event of a fire, the discoverer activates a fire alarm (pull box); calls 911 (509-373-3800 if using a cellular phone) or verifies that 911 has been called; and calls the CCR. Automatic initiation of a fire alarm (through the smoke detectors and sprinkler systems) is also possible. Activation of a fire alarm automatically signals the HFD and the Hanford POC and will be audible in the CCR.

As soon as non-essential personnel are notified of a fire (verbally or by fire alarm activation), they will immediately exit the WTP area or building by the nearest safe exit, proceed to the nearest staging area upwind of the area/building, check-in with PAAs, and follow the instructions of responding personnel. If personnel are reported missing, and might be within the WTP area/building, the BED will be notified. A search will be made, if safe to do so. The BED will initiate emergency response procedures and will notify ERO members and the incident command structure.

Initial actions to be taken by non-response personnel will consist of:

- Unless otherwise instructed, personnel shall evacuate the area/building by the nearest safe exit and proceed to the designated staging area for accountability.
- On actuation of the fire alarm, ONLY if time permits, personnel should shut down equipment, and secure waste.

Trained and certified operations personnel may initiate a plant shutdown depending on the location and severity of the fire, and the location and type of hazards in the affected area. The BED will interface with the appropriate agencies of the incident command structure and will perform the following:

- Proceed directly to the ICP, obtain all necessary information pertaining to the incident, and send a representative to meet Hanford Fire Department.
- Provide a formal turnover to the IC, when the IC arrives at the ICP.
- Inform the Hanford Site Emergency Response Organization as to the extent of the emergency (including estimates of dangerous waste, mixed waste, or radioactive material quantities released to the environment).
- If operations are stopped in response to the fire, ensure that systems are monitored for leaks, pressure buildup, gas generation, and ruptures.

The following is representative of the type of information that the BED may be called upon to provide to the incident command structure or other response agencies:

- Location and health of personnel, including missing personnel and possible locations for fire fighters to search for them
- Location and severity of fire, including character, exact source, and the amount, area, and extent of any released materials
- Known hazardous conditions (such as, radiological, non-radiological, electrical, thermal, flammable materials, pressurized cylinders, toxic gas, pressure systems, batteries, radiation areas)
- Plant operating status
- Utility systems status

- Support for WTP radiological control personnel (that is, monitoring, surveys, sampling, decontamination)
- WTP layout
- Support for firefighter activities as required
- Notifications as required in accordance with plant procedures and DOE/RL-94-02, Section 5.1.1

Following a fire and/or explosion, WAC 173-303-640(7) will be addressed for any WTP tank systems that may have been affected regarding fitness for use.

7.2.5 Hazardous Material, Dangerous and/or Mixed Waste Spill

The WTP has engineering controls to contain or minimize spills. These controls include containment berms, dedicated spill control sumps, remote leak detection systems, remote gauges and level indicators as well as shielding on chemical pipe flanges. WTP procedures provide alarm response and maintenance actions for leak detection equipment, surveillance of possible leak locations, and response actions for detected spills.

Spills can result from many sources including process leaks, container spills or leaks, damaged packages or shipments, or personnel error. Spills of mixed waste are complicated by the need to deal with the extra hazards posed by the presence of radioactive materials.

The following actions will be taken in response to a spill or release of hazardous material, dangerous and/or mixed waste:

- The discoverer notifies the BED and initiates SWIMS response:

  Stops work
  Warns others in the vicinity
  Isolates the area
  Minimizes the spill if possible
  Requests the BED **S**ecure ventilation.

- The BED determines if emergency conditions exist requiring response from the Hanford Fire Department based on classification of the spill and injured personnel, and evaluates need to perform additional protective actions.
- If the Hanford Fire Department resources are not needed, the spill is mitigated with resources identified in Section 9.0 of this plan and proper notifications are made.
- If the Hanford Fire Department resources are needed, the BED calls 911 (509-373-3800 if using a cellular phone).
- The BED sends a representative to meet the Hanford Fire Department.
- The BED provides a formal turnover to the IC when the IC arrives at the ICP.

- The BED informs the Hanford Site Emergency Response Organization as to the extent of the emergency (including estimates of dangerous waste, mixed waste, or radioactive material quantities released to the environment).
- If operations are stopped in response to the spill, the BED ensures that systems are monitored for leaks, pressure buildup, gas generation, and ruptures.
- Hanford Fire Department stabilizes the spill.

As necessary, the BED will also initiate or arrange for the following:

- Notify plant personnel of the spill or release by sounding the appropriate alarm, using the public address system, or other available means.
- Establish a control point at a safe location, and coordinate further spill mitigation activities.
- Obtain all available information pertaining to the event, evaluate the need for event categorization or classification, and begin ERO activation as necessary.
- Initiate use of plant and emergency response procedures.
- Arrange for care of any injured persons.
- Maintain access control at the event site by keeping unauthorized personnel and vehicles away from the area. Security personnel can be used to assist in site control. In determining which areas are to be controlled, the BED will consider environmental factors such as wind velocity and direction.
- Arrange for proper remediation of the event after evaluation, and if required, incident investigation processes have been initiated.
- Remain available for fire, patrol, and other authorities on the scene, and provide all required information.
- Enlist the assistance of alternate BED(s) or ERO personnel, if response activities are projected to be long term.
- Ensure the use of proper protective equipment, remedial techniques, transfer procedures and decontamination procedures by all involved personnel, if remediation is performed by plant personnel.
- Remain at the scene to oversee activities and provide information, if remediation is performed by the HFD HAZMAT Team or other response teams.
- Ensure proper containerization, packaging, and labeling of recovered spill materials.
- Ensure decontamination (or restocking) and restoration of emergency equipment used in the spill remediation before resuming operations.
- Provide required reports after the event in accordance with plant procedures.

Additional actions to be taken in response to a leaking tank include:

- Removal of the leaking tank from service.
- Conduct an investigation to determine the cause of the event.

- Perform repairs or replacements before the tank is returned to service, with, as required, a final approval from an independent certified professional engineer.
- Following an emergency event involving a tank system, address all requirements of WAC 173-303-640(7) regarding fitness for use.

7.2.5.1 Damaged or Unacceptable Shipments

No wastes will be received at the WTP from outside of the Hanford Site. Therefore, this section of the plan is not applicable to the WTP.

7.2.6 Radiological Material Release

7.2.6.1 C2, C3 or C5 Ventilation System Release

If high radiation alarms indicate the occurrence of a radiological material release from the C2, C3 or C5 ventilation system the operating ventilation system can be immediately switched over to the standby HEPA filtration system. Near-contact radiation surveys and additional assessment making use of on-line instruments will be performed to determine the extent of the radiological material released. The actions described in Section 7.2.1.3 will be performed.

7.2.6.2 Release of Mixed Waste into the Plant

If a catastrophic dumping of mixed waste occurs, affected plants or processes will be immediately shut down. The actions described in Section 7.2.5 will be performed.

If a catastrophic dumping causes a high radiation alarm on the C5 or C3 ventilation systems, the standby systems will be started, and actions described in Section 7.2.1.3 will be performed.

7.2.7 Criticality

Analyses have shown that there is no credible criticality event that can be postulated to occur at the WTP (BNI 2001b).

7.3 PREVENTION OF RECURRENCE OR SPREAD OF FIRES, EXPLOSIONS, OR RELEASES

The BED, as part of the ICS, takes the steps necessary to ensure that a secondary release, fire, or explosion does not occur. The BED will take measures, where applicable, to stop processes and operations; collect and contain released wastes and remove or isolate containers. The BED shall also monitor for leaks, pressure buildups, gas generation, or ruptures in valves, pipes, or other equipment, whenever this is appropriate.

7.4 RESPONSE TO NATURAL PHENOMENA

Depending on the severity of the event, the BED reviews sitewide and WTP emergency response procedure(s) and, as required, categorizes and/or classifies the event. If necessary, the BED initiates area protective actions and Hanford Site Emergency Response Organization activation. The steps identified in the following description of actions do not have to be performed in sequence because of the unanticipated sequence of incident events.

7.4.1 Seismic Event

The Hanford Site Emergency Response Organization's primary role in a seismic event is coordinating the initial response to injuries, fires, and fire hazards and acting to contain or control radioactive and/or hazardous material releases.

Individuals should remain calm and stay away from windows, steam lines, and hazardous material storage locations. Once the shaking has subsided, individuals should evacuate carefully and assist personnel needing help. The location of any trapped individuals should be reported to the BED or is reported to 911 (509-373-3800 if using a cell phone).

The BED takes whatever actions are necessary to minimize damage and personnel injuries. Responsibilities include the following:

- Coordinating searches for personnel and potential hazardous conditions (fires, spills, etc.)
- Conducting accountability.
- Securing utilities and facility operations.
- Arranging rescue efforts, and notifying 911 for assistance.
- Determining if hazardous materials were released.
- Determining current local meteorological conditions.
- Warning other facilities and implementing protective actions if release of hazardous materials poses an immediate danger.
- Providing personnel and resource assistance to other facilities, if required and possible.

7.4.2 Volcanic Eruption/Ash fall

When notified of an impending ash fall, the BED will implement measures to minimize the impact of the ash fall. BED actions may include the following:

- Installing filter media over building ventilation intakes
- Installing filter media or protective coverings on outdoors equipment that may be adversely affected by the ash (diesel generators, equipment rooms etc.)
- Shutting down some or all operations and processes
- Sealing secondary use exterior doors

If other emergency conditions arise as a result of the ashfall (e.g., fires due to electrical shorts or lightning), response is as described in other sections of this plan.

7.4.3 High Winds/Tornadoes

Upon notification of impending high winds, the BED takes steps necessary to secure all outdoor waste and hazardous material containers and storage locations.

All doors and windows are shut, and personnel are warned to use extreme caution when entering or exiting the building. Ventilation, utilities, and operations will be shut down as appropriate to lessen the severity of the impact.

7.4.4 Flood

Since the 200 Area is well above projected flood elevations for the Columbia and Yakima Rivers, this section is not applicable.

7.4.5 Range Fire

Responses to range fires are handled by preventive measures (i.e., keeping hazardous material and waste accumulation areas free of combustible materials such as weeds and brush). If a range fire breaches the WTP boundary, the response is as described in Section 7.2.4.

7.4.6 Aircraft Crash

The response to an aircraft crash is the same as for a fire and/or explosion (Section 7.2.4).

7.5 SECURITY CONTINGENCIES

Depending on the severity of the event, the BED reviews sitewide and WTP emergency response procedure(s) and, as required, categorizes and/or classifies the event. If necessary, the BED initiates area protective actions and Hanford Site Emergency Response Organization activation. The steps identified in the following description of actions do not have to be performed in sequence because of the unanticipated sequence of incident events.

7.5.1 Bomb Threat/Explosive Device

Response to a bomb threat/explosive device is discussed in the following sections.

7.5.1.1 Telephone Threat

Individuals receiving telephoned threats attempt to get as much information as possible from the caller (using the bomb threat checklist if available). Upon conclusion of the call, notify the BED and Hanford Patrol by calling 911 (do not use a cellular phone or hand-held radio for reporting a bomb threat/explosion unless beyond 300 feet from suspected object).

The BED evacuates the WTP and questions personnel at the staging area regarding any suspicious objects. When Hanford Patrol personnel arrive, their instructions will be followed.

7.5.1.2 Written Threat

Receivers of written threats should handle the letter as little as possible. The BED and Hanford Patrol will be notified by calling 911 (do not use a cellular phone or hand-held radio for reporting a bomb threat/explosion unless beyond 300 feet from suspected object). Depending on the content of the letter, the BED might evacuate the affected locations. The letter is turned over to Hanford Patrol and their instructions are followed.

7.5.2 Hostage Situation/Armed Intruder

The discoverer of a hostage situation or armed intruder reports the incident to 911 (509-373-3800 if using a cell phone) and to the BED if possible. The BED, after conferring with Hanford Patrol, might covertly evacuate areas not observable by the hostage taker(s)/intruder. No alarms will be sounded.

Hanford Patrol will determine the remaining response actions and will activate the Hostage Negotiating Team, if necessary.

7.5.3 Suspicious Object

The discoverer of a suspicious object reports this object to the BED and to 911 (do not use a cellular phone or hand-held radio for reporting a bomb threat/explosive device unless beyond 300 feet from suspected object), if possible, and ensures that the object is not disturbed.

The BED will evacuate the WTP and (based on the description provided by the discoverer) attempt to determine the identity or owner of the object. Personnel will be questioned at the staging area to attempt to identify the owner of the object.

If the identity/ownership of the object cannot be determined, then Hanford Patrol will assume command of the incident. The canine unit will be used to determine if the package contains explosives. If there is a positive indication of explosives or it cannot be assured that there are no explosives, then an Explosive Ordnance Disposal Team will be dispatched to properly dispose of the object.

8.0 TERMINATION OF EVENT, INCIDENT RECOVERY, AND RESTART OF OPERATIONS

DOE/RL-94-02, Section 9.0, describes actions for event termination, incident recovery, and restart of operations. The extent by which these actions are employed is based on the incident classification of each event. In addition, DOE/RL-94-02, also contains actions for the management of incompatible wastes that might apply.

8.1 TERMINATION OF EVENT

For events where the Hanford Emergency Operations Center (Hanford-EOC) is activated, the RL/ORP Emergency Manager has the authority to declare event termination. This decision is based on input from the BED, IC, and other emergency response organization members. For events where the Hanford-EOC is not activated, the incident command system and staff will declare event termination.

8.2 INCIDENT RECOVERY AND RESTART OF OPERATIONS

A recovery plan is developed when necessary in accordance with DOE/RL-94-02, Section 9.2. A recovery plan is needed following an event where further risk could be introduced to personnel, the WTP facilities, or the environment through recovery action and/or to maximize the preservation of evidence.

If the WTP ERP is implemented in accordance with Section 4.0 of this plan, Ecology must be notified before operations can resume. This notification is in addition to the required reports discussed in Section 5.1 of DOE/RL-94-02 and must include the following statements;

- There are no incompatibility issues with the waste and released materials from the incident.
- All the equipment has been cleaned, fit for its intended use, and placed back into service.

The notification required by WAC 173-303-360(2)(j) may be made via telephone conference. Additional information that Ecology requests regarding these restart conditions will be included in the required 15-day report identified in Section 11.0 of this plan.

For emergencies not involving activation of the Hanford-EOC, the BED ensures that conditions are restored to normal before operations are resumed. If the Hanford Site Emergency Response Organization was activated and the emergency phase is complete, a special recovery organization could be appointed at the discretion of RL to restore conditions to normal. This process is detailed in RL and contractor emergency procedures. The makeup of this organization depends on the extent of the damage and the effects. The onsite recovery organization will be appointed by the appropriate contractor's management.

8.3 INCOMPATIBLE WASTE

After an event, the BED, or the onsite recovery organization ensures that no waste that might be incompatible with the released material is treated, stored, and/or disposed of until cleanup is completed. Clean up actions are taken by WTP personnel or other assigned personnel. DOE/RL-94-02, Section 9.2.3 describes actions to be taken.

Waste from cleanup activities is designated and managed as newly generated waste. A field check for compatibility is performed before storage, as necessary. Incompatible wastes are not placed in the same container. Containers of waste are placed in approved storage areas appropriate for their compatibility class.

If incompatibility of waste was a factor in the incident, the BED or the onsite recovery organization ensures that the cause is corrected

8.4 POST EMERGENCY EQUIPMENT MAINTENANCE AND DECONTAMINATION

All equipment used during an incident is decontaminated (if practicable) or disposed of as spill debris. Decontaminated equipment is checked for proper operation before storage for subsequent use. Consumable and disposed materials are restocked. Fire extinguishers are replaced.

The BED ensures that all equipment is cleaned and fit for its intended use before operations are resumed. Depleted stocks of neutralizing and absorbing materials are replenished, self-contained

breathing apparatus are cleaned and refilled, protective clothing is cleaned or disposed of and restocked, etc.

9.0 EMERGENCY EQUIPMENT

Hanford Site emergency resources and equipment are described and listed in DOE/RL-94-02, Appendix C. Emergency resources and equipment for the WTP are presented in this section.

9.1 FIXED EMERGENCY EQUIPMENT

The following table lists the fixed emergency equipment available at the WTP.

Table 7A-2 Fixed Emergency Equipment

Type	Location	Capability
Safety shower/eye wash station	Throughout the WTP in locations designated by facility procedures.	Assist in flushing chemicals/materials from body or eyes and face.
Automatic sprinkler system	Throughout the WTP.	Assist in the control of fire.
Fire alarm pull boxes	Throughout the WTP.	Activates the building fire alarm and notifies fire department, as developed by Coordination Agreements.
Emergency diesel generators	East of the LAW vitrification building.	Provide emergency power.
Fire hose connections	Throughout the WTP in locations designated by facility procedures.	Allow for connection of fire hoses to site water system for manual fire suppression.
Personnel decontamination rooms	TBD	Personnel decontamination.

Note: TBD = To be determined

9.2 PORTABLE EMERGENCY EQUIPMENT

The following table lists available portable emergency equipment.

Table 7A-3 Portable Emergency Equipment

Type	Location	Capability
General purpose fire extinguishers	Throughout the WTP.	Fire suppression for class A, B, and C fires.
CO_2 or clean-agent fire extinguishers	Throughout the WTP.	Suppress electrical fires.
Miscellaneous emergency equipment	Throughout the facility located in emergency equipment cabinets as	Safety harnesses, blankets, first aid kits, stretchers, emergency lights, and

	designated by facility procedures.	emergency tools.

9.3 COMMUNICATIONS EQUIPMENT/WARNING SYSTEMS

The following table lists all communications and warning systems.

Table 7A-4 Communications Equipment

Type	Location	Capability
Siren System Evacuation STEADY SIREN Take Cover WAVERING SIREN Fire GONG/BELL	Throughout the WTP.	Alert facility personnel of emergency conditions.
PA System	Throughout the WTP.	Provides for information dissemination to facility personnel.
Crash Alarm Telephone system	Throughout the 200 Area.	Telephone system used to disseminate emergency messages.
Fire alarm pull boxes	Throughout the WTP.	Summon aid in the event of a fire.
Telephone system	WTP CCR, office areas, and other plant locations.	Internal and external communications.
Portable two-way radios	Throughout the WTP.	Communications to the CCR.
Pagers	Assigned to key personnel.	To alert key personnel to respond, either individually or by group alert.

9.4 PERSONAL PROTECTIVE EQUIPMENT

The following table lists types of protective equipment available.

Table 7A-5 Personal Protective Equipment

Type	Location	Capability
Waterproof coveralls, Leather protective wear, Respirators, Filtered masks, Oxygen supplies,	Throughout the facility in or near emergency equipment cabinets as designated by facility procedure.	Protection from various hazards (e.g., smoke, fumes, oxygen deficient atmosphere, chemicals, high airborne radioactivity concentrations, radiological contamination)

Escape Paks, SCBAs.		

9.5 SPILL CONTROL AND CONTAINMENT SUPPLIES

The following table lists the locations of spill kits and includes a basic listing of contents.

Table 7A-6 Spill Kits and Spill Control Equipment

Type	Location	Capability
Absorbent materials 55-gal drums Overpack drums Bags Step-off pads Protective clothing Chemical resistant coveralls Surgical and chemical gloves Acid Goggles/Face shields Sodium-bicarbonate Barrier Tape Rags Scissors Flashlight Batteries pH paper Mop handles Mop heads Mop bucket with wringer Hazardous material labels Non-sparking shovel Hazardous absorbent booms Ear plugs Portable barriers	Throughout the facility in or near spill kit cabinets as designated by facility procedures.	Control and mitigation of radioactive and chemical spills.

9.6 INCIDENT COMMAND POST

The WTP primary ICP is located in the administration building. Alternate locations will be determined at the time of the emergency, if necessary. The location may be inside a building or outside, and may change depending on the weather, wind direction, and location and severity of the event. The IC could also activate the Hanford Fire Department Mobile Command Unit if necessary.

The ICP will contain the following:

- Telephone communications, (including speakerphones and headsets) including the Hanford Site crash telephone system
- Radio communications
- Access to the public address system
- Access to plant operations data
- Access to plant systems information
- Access to accountability and building access control information
- Access to the Hanford Local Area Network (HLAN) as necessary

10.0 COORDINATION AGREEMENTS

RL has established a number of coordination agreements, or memoranda of understanding (MOU) with various agencies to ensure proper response resource availability for incidents involving the Hanford Site. A description of the agreements is contained in DOE/RL-94-02, Section 3.0, Table 3-1.

11.0 REQUIRED REPORTS

Post incident written reports are required for certain incidents on the Hanford Site. The reports are described in DOE/RL-94-02, Section 5.1.

Facility management must note in the WTP operating record, the time, date, and details of any incident that requires implementation of the contingency plan (refer to Section 4.0 of this plan). Within fifteen (15) days after the incident, a written report must be submitted to Ecology. The report must include the elements specified in WAC 173-303-360(2)(k).

If a release from a tank system occurs that requires notification according to WAC 173-303-640 (7), notification as described in WTP procedures will be followed.

12.0 PLAN LOCATION AND AMENDMENTS

Copies of this plan are maintained at the following locations:

- WTP CCR
- RL-EOC
- POC
- HFD

Portions of the plan will be reviewed and immediately amended if necessary, when conditions described in DOE/RL-94-02, Section 14.3.1.1 occur. In addition, the plan will be revised prior to the introduction of bulk quantities of hazardous chemicals into the WTP. This will include information that is not currently available. Subsequently, the plan will be reviewed and updated annually.

13.0 FACILITY/BUILDING EMERGENCY RESPONSE ORGANIZATION

The following table lists the BEDs by job title.

Building Emergency Director

Table 7A-7 WTP BEDs

Title	Location	Phone
Shift Operations Manager (SOM), Pretreatment Building	Central Control Room, Pretreatment Building	TBD
SOM, LAW Building	Control Room, LAW Building	TBD
SOM, HLW Building	Control Room, HLW Building	TBD

Names and home telephone numbers of the BEDs will be available from the POC (509-373-3800) in accordance with Hanford Facility RCRA Permit, Dangerous Waste Portion, General Condition II.A.4. This list will be available prior to the introduction of bulk quantities of hazardous chemicals into the WTP.

14.0 REFERENCES

BNFL Inc. 1999b. *Draft Work Plan for Screening Level Risk Assessment for the RPP-WTP*, RPT-W375-EN00001, Revision D, 15 November 1999. BNFL Inc., Richland, Washington, USA.

BNI 2001a. *River Protection Project – Waste Treatment Plant Dangerous Waste Training Plan*, Revision 1, August 2001. Bechtel National Incorporated, Richland, Washington, USA.

BNI 2001b. *Criticality Safety Evaluation Report for RPP-WTP*, 24590-WTP-RPT-NS-01-001, Revision 0, Sept 4, 2001. Bechtel National Incorporated, Richland, Washington, USA.

DOE Order 232.1, *Occurrence Reporting and Processing of Operations Information*, United States Department of Energy, Washington D.C.

DOE/RL-94-02, *Hanford Emergency Management Plan*, as amended

WAC 173-303, *Washington State Dangerous Waste Regulations, Washington Administrative Code*, Washington State Department of Ecology, Olympia, Washington, as amended

Ecology, 1994, *Dangerous Waste Portion of the Hanford Facility Resource Conservation and Recovery Act Permit for the Treatment, Storage, and Disposal of Dangerous Waste*, Permit Number WA7890008967, Washington State Department of Ecology, Olympia, Washington, as amended

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Appendix 7A-A

List of Emergency Response Procedures

DOE-0223, *Emergency Plan Implementing Procedures*: RLEP 3.4, "Emergency Termination, Reentry, and Recovery"

DOE-0223, *Emergency Plan Implementing Procedures*: RLEP 1.1, "Hanford Incident Command System and Event Recognition and Classification"

DOE-0223, *Emergency Plan Implementing Procedures*: RLEP 1.0, " Recognizing and Classifying Emergencies," Appendix 1-X.X.

Facility specific procedures will be available prior to the introduction of bulk quantities of hazardous chemicals into the WTP.

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Appendix 7A-B

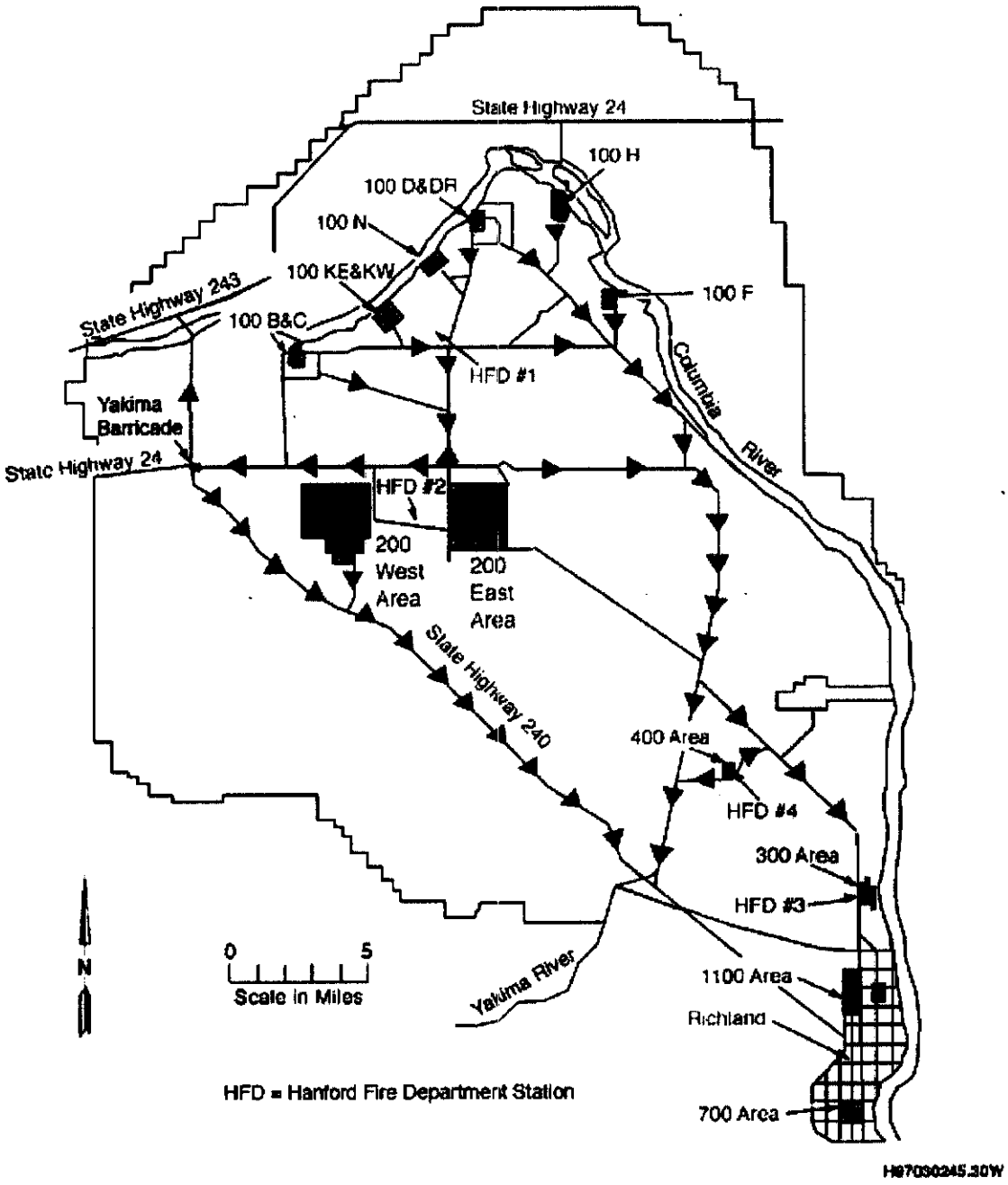
Evacuation Routes

This Appendix will contain figures of:

- The site plot plan showing the position of the staging areas.
- Floor plans for each WTP building showing evacuation routes.

These figures will be provided prior to the introduction of bulk quantities of hazardous chemicals into the WTP.

Figure 7A-B-1 Hanford Site Evacuation Routes



Chapter 8.0

Personnel Training

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CHAPTER 8.0
PERSONNEL TRAINING

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8.0 PERSONNEL TRAINING [H]

This chapter discusses personnel training requirements based on Washington Administrative Code (WAC) 173-303 and the *Dangerous Waste Portion of the Resource Conservation and Recovery Act Permit for the Treatment, Storage, and Disposal of Dangerous Waste* (Ecology 1994a). In accordance with WAC 173-303-806(4)(a)(xii), the Hanford Facility Dangerous Waste Part B Permit Application must contain two items:

1 "An outline of both the introductory and continuing training programs by owners or operators to prepare persons to operate or maintain the TSD facility in a safe manner as required to demonstrate compliance with WAC 173-303-330"

2 "A brief description of how training will be designed to meet actual job tasks in accordance with the requirements in WAC 173-303-330(1)(d)"

The Hanford Facility RCRA Permit (Dangerous Waste [DW] portion)(Ecology 1994a), Condition II.C (personnel training) contains training requirements applicable to Hanford Facility personnel and non-facility personnel.

Compliance with these requirements at the River Protection Project - Waste Treatment Plant (WTP) is demonstrated by information contained in both Chapter 8.0 of the *Hanford Facility Dangerous Waste Permit Application, General Information Portion* (DOE-RL 1998), Attachment 33 of the Hanford Facility RCRA Permit (DW Portion), and this chapter. This chapter supplements Chapter 8.0 of DOE/RL-91-28.

8.1 OUTLINE OF INTRODUCTORY AND CONTINUING TRAINING PROGRAMS

The introductory and continuing training programs are designed to prepare personnel during the operations phase, to manage and maintain the WTP in a safe, effective, and environmentally sound manner. In addition to preparing personnel to manage and maintain the WTP under normal conditions, the training programs ensure that personnel are prepared to respond in a prompt and effective manner should abnormal or emergency conditions occur. Emergency response training is consistent with the description of actions contained in Chapter 7.0, *Contingency Plan*. The introductory and continuing training programs contain the following objectives:

- Teach WTP personnel to perform their duties in a way that ensures the WTP's compliance with WAC 173-303
- Teach WTP personnel dangerous waste management procedures (including implementation of the contingency plan) relevant to the job titles and positions in which they are employed
- Ensure that WTP personnel can respond effectively to emergencies

8.1.1 Introductory Training

Introductory training includes general Hanford Facility training and WTP-specific training. General Hanford Facility training is described in DOE/RL-91-28, Section 8.1, and provided in accordance with the Hanford Facility RCRA Permit (DW Portion), Condition II.C.2. WTP-

specific training is provided to WTP personnel allowing personnel to work unescorted, and in some cases is required for escorted access. WTP personnel cannot perform a task for which they are not properly trained, except to gain required experience while under the direct supervision of a supervisor or coworker who is properly trained. WTP personnel must be trained within six months after their employment at or assignment to the WTP. If personnel are assigned to a new job title or position at the WTP, any additional position-specific training must be completed within six months.

General Hanford Facility training: Refer to description in DOE/RL-91-28, Section 8.1.

Contingency plan training: WTP personnel receive training on applicable portions of the *Hanford Emergency Management Plan* (DOE-RL 1999)(Attachment 4 of the Hanford Facility RCRA Permit [DW Portion]) in General Hanford Facility training. In addition, WTP personnel receive training on the description of actions contained in the Contingency Plan documentation in Chapter 7.0 and Appendix 7A of this permit application, to be able to effectively respond to emergencies at the WTP.

Emergency coordinator training: WTP personnel who perform emergency coordinator duties as specified in WAC 173-303-360 (for example, the Building Emergency Director) in the Hanford Incident Command System receive training on implementation of the Contingency Plan and fulfilling the position within the Hanford Incident Command System. These WTP personnel must also become thoroughly familiar with applicable Contingency Plan documentation, operations, activities, location, and properties of waste handled, location of records, and the unit and building layout.

Operations training: Dangerous waste management operations training (for example, waste designation training, shippers training) will be determined on a unit-by-unit basis, and shall consider the type of waste management unit and the type of activities performed at the waste management unit. For example, training provided for management of dangerous waste in containers will be different than the training provided for management of dangerous waste in a tank system. Common training required for compliance within similar waste management units can be provided in general training, and supplemented at the WTP. Training provided for WTP-specific operations will be identified in the training plan documentation, and will be based on:

- Whether a general training course exists
- The training needs to ensure waste management unit compliance with WAC 173-303
- Training commitments agreed to with the Washington State Department of Ecology

8.1.2 Continuing Training

Continuing training meets the requirements for WAC 173-303-330(1)(b) and includes General Hanford Facility training and WTP-specific training.

General Hanford Facility training: Annual refresher training is provided for General Hanford Facility training. Refer to description in DOE/RL-91-28, Section 8.1.

Contingency plan training: Annual refresher training is provided for contingency plan training. Refer to description above in Section 8.1.1.

Emergency coordinator training: Annual refresher training is provided for emergency coordinator training. Refer to description above in Section 8.1.1.

Operations training: Refresher training occurs on various frequencies for operations training (that is, annual, every other year, every three years). When justified, some training will not contain a refresher course and will be identified as a one-time-only training course. The WTP training plan documentation will specify the frequency for each training course. Refer to description above in Section 8.1.1.

8.2 DESCRIPTION OF TRAINING DESIGN

A properly designed training program ensures that personnel who perform duties at the WTP related to WAC 173-303-330(1)(d) are trained to perform their duties in compliance with WAC 173-303. Actual job tasks, referred to as duties, are used to determine training requirements.

- The first step taken to ensure that WTP personnel have received the proper training is to determine and document the waste management duties by job title/position.
- In the second step, waste management duties are compared to the general waste management unit training curriculum. If the general waste management unit training curriculum does not address the waste management duties, the training curriculum is supplemented and/or on-the-job training is provided.
- The third step summarizes the content of a training course necessary to ensure that the training addresses the appropriate waste management duties.
- The fourth and last step is to assign training curriculum to WTP personnel based on their job title/position. The training plan documentation contains this process.

Waste management duties include those specified in Section 8.1, as well as those contained in WAC 173-303-330(1)(d). Training elements of WAC 173-303-330(1)(d) applicable to WTP operations include the following:

- Procedures for using, inspecting, repairing, and replacing emergency equipment and monitoring equipment
- Key parameters for automatic waste feed cut-off systems
- Communications or alarm systems
- Response to fires or explosions
- Response to groundwater contamination incident
- Shutdown of operations

WTP personnel who perform these duties receive training pertaining to their duties. The training plan documentation described in Section 8.3 contains specific information regarding the types of training WTP personnel receive based on the outline in Section 8.1.

8.3 DESCRIPTION OF TRAINING PLAN

In accordance with Hanford Facility RCRA Permit (DW portion), Condition II.C.3, the unit-specific portion of the *Hanford Facility Dangerous Waste Permit Application* must contain a description of the training plan. Training plan documentation is maintained outside of the *Hanford Facility Dangerous Waste Part B Permit Application* and the Hanford Facility RCRA permit. Therefore, changes made to the training plan documentation are not subject to the Hanford Facility RCRA Permit modification process. However, the training plan documentation is prepared to comply with WAC 173-303-330(2).

Documentation prepared to meet the training plan consists of hard copy and/or electronic media as provided by Hanford Facility RCRA Permit (DW portion), Condition II.C.1. The training plan documentation consists of one or more documents and/or a training database with the components identified in the core document.

A description of how training plan documentation meets the three items in WAC 173-303-330(2) is as follows:

1 -330(2)(a): "The job title, job description, and name of the employee filling each job. The job description must include requisite skills, education, other qualifications, and duties for each position."
Description: The specific WTP personnel job title and position is correlated to the waste management duties. Waste management duties relating to WAC 173-303 are correlated to training courses to ensure training is properly assigned.

Only names of WTP personnel who perform duties relating to waste management operations at the WTP are required to be maintained. Names are maintained as described in the training plan documentation. A list of personnel assigned to the WTP is available upon request.

Information on requisite skills, education, and other qualifications for job title and positions are addressed by providing a reference where this information is maintained (for example, Human Resources). Specific information concerning job title, requisite skills, education, and other qualifications for personnel can be provided upon request.

2 -330(2)(b): "A written description of the type and amount of both introductory and continuing training required for each position."
Description: In addition to the outline provided in Section 8.1, training courses developed to comply with the introductory and continuing training programs are identified and described in the training plan documentation. The type and amount of training is specified in the training plan documentation. Table 8-1 is included as an example of a typical Training Matrix that shows typical job/titles and positions matched to a training category.

3 -330(2)(c): "Records documenting that personnel have received and completed the training required by this section. The Department may require, on a case-by-case basis, that training records include employee initials or signature to verify that training was received."
Description: Training records are maintained consistent with DOE/RL-91-28, Section 8.4.

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Table 8-1 Typical WTP Training Matrix

Training Category[a]								
DOE/RL-96-28 Chapter 8 Training Category	**General Hanford Facility Training**	**Contingency Plan Training**	**Emergency Coordinator Training**	**Operations Training**				
WTP DWTP Implementing Category	**Orientation Program**	**Emergency Management Plan**	**Emergency Coordinator Training**	**General Waste Mgmt**	**Container Mgmt**	**Tank System Mgmt**	**Containment Buildings Mgmt**	**Misc Unit Mgmt**
Typical Job Title/Position								
Operators	X	X		X		X	X	X
Shift Operations Manager	X	X	X	X	X	X	X	X
Hazardous Waste Operations (HWO) Manager	X	X		X	X	X	X	X
Operations Manager	X	X	X	X				
Environmental Compliance Officer	X			X				
Waste Service Provider	X			X	X			
Hazardous Waste Operators	X	X		X	X	X	X	X
Laboratory Technician –Hazardous Waste Operations (HWO)	X	X		X	X			
Laboratory Technician	X	X						
Laboratory Manager	X	X	X		X			

[a]Refer to the WTP Dangerous Waste Training Plan for a complete description of coursework in each training category.

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Chapter 11.0

Closure

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CHAPTER 11
CLOSURE

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11.0 CLOSURE AND FINANCIAL ASSURANCE (I AND I-1)

This chapter of the Dangerous Waste Permit Application is the closure plan for the River Protection Project Waste Treatment Plant (WTP). This closure plan describes the activities that are necessary to close the WTP. The procedures and estimated times to complete these activities are discussed in this plan.

This closure plan is provided in compliance with the applicable requirements of the *Washington Administrative Code* (WAC) 173-303-610, -620, and –806. The closure plan is specifically required to be included in the permit application by WAC 173-303-806(4)(a)(xiii). This plan is also intended to demonstrate compliance with Conditions II.J and II.K of the *Dangerous Waste Portion of the Resource Conservation and Recovery Act Permit for the Treatment Storage and Disposal of Dangerous Waste at the Hanford Facility* (Ecology 1994a). The closure plan will be revisited and submitted prior to the start of mixed waste processing.

With several exceptions, this plan follows the format of a typical closure plan as outlined in the *Dangerous Waste Permit Application Requirements for Facilities Which Store and/or Treat Dangerous Wastes in Tank Systems and Containers* (Ecology 1996). The exceptions are the exclusion of sections that do not apply to the WTP (financial assurance, liability, "already closed disposal unit", and post-closure requirements), and the addition of new sections not addressed in the guidance (closure of tank, container storage, and containment building units).

11.1 INTRODUCTION

This closure plan identifies the steps and procedures necessary to completely close the WTP at any point in its active life. This includes the removal of dangerous and mixed waste and the decontamination of the permitted units, ancillary equipment, and containment systems. The closure activities will be consistent with the requirements of the WTP deactivation plan, and the decontamination and decommissioning plan. These plans are to be prepared under separate authorities. They will be revised, or the closure plan will be revised as necessary to maintain consistency between the plans. Deactivation is discussed further in Sections 11.3.2 and 11.7.

Treatment, storage, and disposal (TSD) facilities located at the Hanford Site are exempt from the closure cost estimate requirements of WAC 173-303-620, in accordance with Condition II.H.3 of the Hanford RCRA Permit. However, Condition II.H.1 of the Hanford RCRA Permit requires submittal of an annual report updating projections of anticipated costs for closure (see Section 11.9).

11.1.1 Closure Plan Overview

Mixed waste will be handled and stored in the following areas of the WTP:

- Pretreatment plant building (tank systems, container storage areas, and containment buildings)
- Waste transfer lines from the United States Department of Energy (DOE), double-shell tank (DST) system unit, to the WTP pretreatment building (tank system ancillary equipment)

- Intra-facility transfer lines between WTP buildings
- Effluent transfer lines from the WTP pretreatment building, to the Liquid Effluent Retention Facility (LERF) and the Effluent Treatment Facility (ETF) (tank system ancillary equipment)
- Low Activity Waste (LAW) vitrification building (miscellaneous units, tank systems, container storage areas and containment buildings)
- High-Level Waste (HLW) vitrification building (miscellaneous unit, tank systems, container storage areas, and containment buildings)
- Laboratory
- WTP Central Waste Storage area and two melter storage buildings (container storage areas)

Dangerous (non-mixed) waste will be stored in the dangerous waste container storage building. This unit is a separate structure located on the west side of the pretreatment building.

The permitted mixed and dangerous waste management units in the WTP are identified in Chapter 4 of this application. The WTP dangerous and mixed-waste management units, including ancillary equipment, secondary containment areas, supporting structures and underlying soil, are addressed in this closure plan. Closure of the pipelines connecting the WTP with the DST system unit and the LERF/ETF will be integrated with those respective facilities. Closure criteria will be developed jointly by DOE, its contractors, and Ecology prior to initiating closure activities. DOE will be responsible for implementing the clean-up standards.

The closure plan indicates several potential Hanford treatment, storage, and disposal units that may be used to manage wastes generated during closure of the WTP. These identifications are preliminary, and are subject to change as the Hanford facility is developed, and as the Hanford RCRA Permit is modified in the future.

The remainder of the closure plan provides the following information:

- Section 11.2 of the closure plan identifies the regulatory standards that apply to closure, and the processes to be used for developing specific cleanup standards that will be achieved during closure.
- Section 11.3 describes the overall approach for removing the waste inventory, flushing and decontamination operations, removing and disposing of contaminated equipment and residues, and inspections and sampling to verify clean closure.
- Section 11.4 describes other activities, including certification of completion of closure, control of run-on and runoff during closure, and equipment reuse.
- Section 11.5 provides the maximum possible waste inventory.
- Section 11.6 describes the closure procedures for each type of dangerous waste management unit.
- Section 11.7 provides the schedule for closure.

- Section 11.8 describes the demonstration required to support a request to extend the standard 90 and 180-day waste removal and closure completion time limits, as specified in WAC 173-303-610(4)(a) and (b).
- Section 11.9 discusses the annual submittal of updated anticipated costs of closure, as required by Condition II.H.1 of the Hanford RCRA Permit (Ecology 1994a)

11.1.2 Closure Plan Revisions

This closure plan will be revised and resubmitted to Ecology for review and approval prior to the start of mixed waste processing. This revision will include any changes to the WTP operating plans or design that may affect the closure of the plant. Any addition of new dangerous wastes or dangerous constituents to the wastes treated or stored at the WTP will also be included in the revision of the closure plan.

Clean closure is the goal for the WTP. The closure plan will be revised if efforts to achieve the clean closure standards for the WTP structures or soil are unsuccessful. The "modified closure" approach may be followed if feasible, as provided in Condition II.K.3 of the Hanford RCRA Permit. It may also be closed as a landfill, as provided in Condition II.K.4 of the Hanford RCRA Permit, if the clean closure standards are not technically or economically feasible. The revised closure plan will be accompanied by a written request for modification of the permit.

The design life of the WTP is 40 years after the initiation of waste treatment operations. The actual operating life of the plant may change depending on expansion in treatment capacity, improvements in treatment technology, or many other factors. The closure plan will be revised and submitted for approval under WAC 173-303-830 (Permit Changes) to incorporate future advances in decontamination technology, changes in plant capacity, newly designated dangerous waste, or other factors that may affect the closure of the plant.

The closure plan will also be revised before the start of closure work, based on relevant information from the operational history of the WTP. The final revised closure plan will provide the necessary final detailed decontamination schedule and procedures, sampling and analysis plan, health and safety plan, the interface with DST system unit and LERF/ETF closure plans, and additional information dependent on future conditions, as indicated in the following pages.

11.2 CLOSURE PERFORMANCE STANDARD (I-1a)

The WTP will be closed in accordance with the requirements of Conditions II.J and II.K of the Hanford RCRA Permit.

Clean closure requires decontamination or removal and disposal of dangerous waste, waste residues, contaminated equipment, soil, or other material, in accordance with the clean closure performance standards of WAC 173-303-610(2). Clean closure as described in this closure plan will accomplish the following:

- Minimize the need for future maintenance

- Control, minimize, or eliminate, to the extent necessary to protect human health and the environment, post-closure escape of dangerous waste, dangerous constituents, leachate, contaminated runoff, or dangerous waste decomposition products, to the ground, surface water, groundwater, or the atmosphere
- Return the land to the appearance and use of the surrounding land areas to the degree possible given the nature of the previous dangerous waste activity

This closure plan proposes to decontaminate structures and equipment to reasonable exposure limits. Activities beyond that point will be decided and documented in the revised plan prior to closure. The WTP buildings will not be used for RCRA-regulated TSD activities following clean closure, unless a new permit is issued.

The appearance of the land where the WTP buildings are located will be consistent with the appearance and future use of the surrounding processing land areas, after completion of clean closure activities. The WTP buildings will remain at the site until final disposition is determined and implemented. The WTP buildings may be demolished, if the buildings will have no future mission. Future land use decisions will be considered during the WTP decommissioning process. The final decision on building disposition and the appearance and use of the plant area will be integrated with the decisions on disposition of the buildings in the adjacent 200 East Area.

The long-term future use of the WTP site and the adjacent 200 Areas was addressed in the *Final Hanford Comprehensive Land-Use Plan Environmental Impact Statement* (DOE 1999). The Central Plateau as defined in that document includes the United States Ecology commercial waste disposal facility, the DOE ERDF, and the 200 West and 200 East Areas, as well as the WTP site. The land use classification attached to the Central Plateau is "industrial (exclusive)", indicating the expected continuing operation of DOE waste management facilities, and permanent institutional controls.

Units where mixed or dangerous wastes have been treated or stored will undergo closure activities. Contaminated equipment, debris, and solid decontamination residues generated during the closure of the WTP will be designated and packaged in accordance with the appropriate regulatory requirements (expected to be the Washington Administrative Code Dangerous Waste Regulations in effect at the time of closure). The waste will then be transferred to a permitted treatment, storage, or disposal unit either on or off the Hanford Site. Equipment and debris that are not adequately decontaminated will be treated to comply with land disposal restriction requirements. Radiologically-contaminated liquid decontamination solutions or agents generated during closure activities will be collected, designated, and transferred to an appropriate TSD unit for treatment and/or disposal.

If a product, residual waste, or decontamination fluid is spilled or released during closure activities, spill response will be initiated as described in Chapter 7 and Appendix 7A (*River Protection Project – Waste Treatment Plant Emergency Response Plan* of this permit application. The residual waste will be collected, designated, and managed appropriately. The

waste will be managed in accordance with the appropriate regulatory requirements (expected to be the Washington Administrative Code Dangerous Waste Regulations in effect at the time of closure).

Clean Debris Surface

This closure plan proposes use of a "clean debris surface", defined in the following paragraph, as the clean closure performance standard for the metal structures and equipment and concrete structures that will remain after closure, which are able to be visually inspected. Attainment of a clean debris surface can be verified visually in accordance with the standard in WAC 173-303-140(2)(a), incorporating 40 CFR 268.45, Table 1, footnote 3, which states:

> "Clean debris surface" means that the surface, when viewed without magnification, shall be free of all visible contaminated soil and hazardous (dangerous) waste except that residual staining from soil and waste consisting of light shadows, slight streaks, or minor discolorations, and soil and waste in cracks, crevices, and pits may be present provided that such staining and waste and soil in cracks, crevices, and pits shall be limited to no more than 5 % of each square inch of surface area."

The clean debris surface standard will be achieved by using the physical and chemical extraction techniques identified in 40 CFR 268.45, Table 1. The primary method of decontamination will be water washing, followed by a choice of using chemical decontamination solutions, ultrahigh pressure water technologies, impact technologies such as sand blasting, or CO_2 blasting or other new technologies that may be developed prior to closure. Physical extraction methods that remove up to 0.6 cm of concrete will be used only after the previous technologies have failed to result in a clean-debris surface, or if there has been a failure of the coated concrete surface. Visual verification may be performed by direct worker observation with written inspection documentation (Figure 11-4, Decontamination Checklist), or by other means such as remote-operated closed circuit television and videotape.

Concrete surfaces may be protected with a contamination-resistant protective coating. Protective coatings in good condition may be decontaminated using one of the technologies described above, then inspected to determine if a clean debris surface is present in the same manner as steel or other metal surfaces. If there is evidence that a release has occurred, such as confirmation of contamination behind a cladding breach or identification of damaged or deteriorated protective coating on a concrete floor where a waste release has occurred, and if the concrete is adjacent to soil, a contamination investigation using visual and radiological surveys will be performed.

If the concrete protective coating exhibits more damage than hairline cracks and has lost integrity, the concrete surface under the deteriorated coating will be treated with aggressive physical extraction technologies such as high pressure water or scabbling, to remove at least 0.6 cm of material below the original surface. This approach also applies to uncoated concrete behind or beneath cladding breaches. The exposed concrete will again be inspected to verify that the clean debris surface standard is met. The treatment will be repeated until the clean debris

surface standard is met. Closure standards for soil underlying the WTP are addressed in Section 11.2.1.

Designation Limit

Some waste handling equipment metal surfaces cannot be visually inspected (for example, internal pipe, pump, and tank surfaces). A component or portions of a component may be flushed with decontamination solutions, if it cannot be decontaminated to meet the clean debris surface standard, or if it cannot be inspected to verify that it meets the standard. The decontamination solution, or rinsate, will be sampled and analyzed using methods complying with *Test Methods for Evaluating Solid Waste, Physical Chemical Methods* (EPA 1986) for indicator constituents. Analytical data that meet the criteria defined in WAC 173-303-610(2)(b) will indicate successful decontamination and attainment of the clean closure performance standard. The rinsate analysis criteria is hereafter referred to as the designation limit standard.

Closure Strategy for Tank Systems

The general closure strategy for tank systems is outlined in flowcharts in Figure 11-1 and Figure 11-2. Triple-rinsing followed by visual inspections is an accepted method of decontaminating tanks. However, modification of this technique may be necessary, if determined at a later date.

Figure 11-1 shows that internal flushing and decontamination of tanks and ancillary equipment, inspection of the secondary containment area, and sealing of observed cladding breaches will be performed prior to final decontamination efforts. Disposition of solid and liquid treatment residuals is shown only at the initial flushing step (below "flush tanks, piping"), to avoid unnecessary complexity in Figure 11-1. The residuals from the following internal and external decontamination steps are expected to follow the same paths.

The two "more decon?" decision boxes in Figure 11-1 (following determinations that decontamination efforts so far have been inadequate) are the symbols for the key decisions the future closure managers will have to make:

1 Perform additional decontamination in hopes of attaining the clean closure standard
2 Stop decontamination and designate that tank or ancillary equipment as mixed waste to be removed, reduced in size, encapsulated, packaged, and disposed

Figure 11-1 does not show that additional decontamination of external tank or other surfaces may be required to continue on the disposal path (after "remove, dispose of as mixed waste"), because such additional decontamination, if required, will be due to radiological dose concerns, not dangerous waste requirements. Figure 11-1 also illustrates the assumption that internal surfaces of tanks and ancillary equipment cannot be adequately or efficiently decontaminated and/or inspected to demonstrate that the clean debris surface standard is met, and that the decontamination solution or rinsate designation limit standard will apply to all internal tank system surfaces. Listed waste codes will be managed through use of the debris standard, through a "contained in determination", or other approach described in the Sampling and Analysis Plan identified in Section 11.3.4.

Closure Strategy for Containment Areas

Figure 11-2 shows the strategy for closure of containment areas. These steps illustrate the approach for decontaminating stainless steel liners and coated concrete surfaces. Containment area liner breaches may need to be sealed prior to decontamination or removal of equipment. The general procedure for investigating liner breaches or breaks, and decontaminating the concrete behind or below such breaches, is shown in Figure 11-2.

The closure strategy for concrete with intact protective coatings is simple. If a release of dangerous or mixed waste in the unit has not been documented in the facility operating record, and no evidence of a release is found during the initial closure inspection, the assumption will be made that the concrete floor surface meets the clean debris surface standard.

If a release has been documented, and the concrete does not meet the clean debris standard, decontamination technologies, as described in Section 11.2, will be performed until the clean debris standard can be met and documented.

If evidence is found that a release has occurred on a concrete floor where the protective coating has even minor cracking, physical extraction will be required. Physical extraction of the concrete surface will also be required in areas where the protective coating is substantially damaged or deteriorated; for example, if it is broken or peeling, whether a release is documented or not. The extraction will be followed by an inspection to verify and document the presence of a clean debris surface. The inspection will also determine whether the underlying concrete is significantly deteriorated or cracked and has lost integrity. If so, further physical extraction will be required. If a release is documented at such a location and the concrete at that location is resting on or against soil, a soil investigation may be required. These steps are illustrated in the last two boxes before the final decision box, "Visible Crack or Decomposed Concrete?" in Figure 11-2.

Closure Strategy for Soil

The criteria for determining whether additional soil investigation is required are shown in the final decision box in Figure 11-3. Contaminated soil will be removed to meet risk-based concentration limits, referred to as the soil cleanup limits (see Section 11.2.1). Soil sampling and analyses will be performed after removal to verify compliance with the soil cleanup standard. Figure 11-3 shows the strategy for addressing potential impacts to soil and groundwater.

Compliance with this plan and attainment of the closure standards will be documented by videotape or written inspection records, such as those shown in the sample checklist in Figure 11-5, the example Closure Certification in Figure 11-6, and other supporting records as discussed in Section 11.4.1.

11.2.1 Closure Standards for Soils, Groundwater, Surface Water, and Air (I-1a(1))

The design of the WTP is intended to prevent the release of dangerous waste to the soil, groundwater, surface water, or air. Clean closure of the soil beneath the WTP will be accomplished by demonstrating that the stainless-steel process cell liners, and the coated concrete walls and floors in other units, have not lost integrity and have therefore prevented

contaminants from reaching the soil. If loss of containment integrity has occurred, the potential for soil contamination will be investigated. The demonstrations will consist of performing and documenting inspections and decontamination work, and soil investigations and removal, if necessary.

The need for sampling of soil will be determined on a unit-specific basis, and will take into consideration the unit operating history. Liner (cladding) inspections will be performed by the following methods: remote closed-circuit television (CCTV), if necessary due to radiation levels; gamma camera; and dye penetrant or other nondestructive evaluation techniques. The inspections will look for areas of severe corrosion of the steel, seam weld failure, or accumulations of waste constituents in cracks or beneath cladding.

Where a dangerous waste release is known or suspected to have occurred, the following conditions indicate probable containment failure and potential soil contamination: the existence of radiological contamination in concrete floors or walls that are in contact with soil; or the observation of potential through-thickness cracks or crumbling concrete at a liner breach location or at a unit with deteriorated concrete floor coating. Potential soil contamination will be investigated through coring and sampling of both the concrete and the soil. Biased sampling will be focused in the vicinity of the liner defect or coating defect, concrete cracks, or in the known or suspected release location. Samples will be analyzed for constituents of concern (COCs). The proposed COCs will be submitted to Ecology with the revised closure plan submitted before the start of closure. The COCs to be used will be developed using process knowledge, the operating record, and waste characterization analyses, whenever possible.

Industrial exposure assumptions will be incorporated in the calculation of soil concentration limits. These exposure assumptions are justified based on the anticipated long-term use of the WTP site and surrounding land, as addressed in the *Final Hanford Comprehensive Land-Use Plan Environmental Impact Statement,* (DOE 1999), as noted in Section 11.2. The appropriate risk-based clean-up standard will be consistent with the future land-use classification. The standard will be reviewed prior to initiating closure to ensure it is still appropriate. Risk assessment principles will be used to establish clean closure concentration limits for soils in accordance with WAC 173-303-610(2)(b)(i). Given the long operating life of the WTP and the current state of flux in risk assessment assumptions, toxicity data, and regulatory guidance, calculation of specific limits is not appropriate at this time.

In establishing soil clean closure concentration limits, consideration will also be given to "area background", as defined in Ecology's *Guidance on Sampling and Data Analysis Methods* (Ecology 1995). The *TWRS Phase 1 Privatization Site Preconstruction Characterization Report* (HNF 1998) and the *Hanford Site Background Part 1, Soil Background for Nonradioactive Analytes* (DOE/RL 1995), or other site-specific soil background information will be used to assist in determining background levels in the soil. If the closure soil sample data are at or below the calculated soil cleanup levels, or the site-specific background concentrations, whichever is greater for each constituent, the soil will be considered clean-closed.

Due to the level of containment provided at the WTP, non-permitted releases of wastes to soil, groundwater, surface water, or air are not anticipated.

Soil sampling will be addressed in a sampling and analysis plan (SAP) that will be included in the revised closure plan. An outline for the SAP is provided in Section 11.3.4 of this plan. The SAP will be consistent with *Guidance for Clean Closure of Dangerous Waste Facilities* (Ecology 1994c).

Specific soil clean closure levels will be developed in consultation with Ecology, and submitted in a revised closure plan for Ecology review and approval prior to the start of closure.

11.2.2 Closure Standards for Decontamination of Structures and Equipment (I-1a(2))

Some of the waste-contaminated structures and ancillary equipment that will undergo decontamination during the closure of the WTP consist of equipment with smooth metal surfaces. Concrete and protective coating surfaces will also be decontaminated as part of closure. The types of structures and associated equipment that may be decontaminated to meet the clean debris surface standard include, but are not limited to:

- Interior and exterior tank and pipe surfaces
- Containment area stainless steel liners (cladding)
- Uncoated concrete floors and walls behind cladding
- Coated concrete walls and ceilings above secondary containment cladding
- Coated concrete floors

Decontamination of interior surfaces of tanks and pipes, and documentation that they meet the clean debris surface standard, may or may not be possible, given the current state of decontamination and inspection technologies. At present, the available miniature equipment may not be adequate to remove hardened waste or contaminated corrosion coatings from relatively inaccessible interior tank and pipe surfaces. Similarly, available video equipment may not provide the inspection capability necessary to demonstrate attainment of the clean debris surface standard on interior surfaces. The criteria for whether or not decontamination is possible will be developed and submitted for approval prior to initiating closure activities.

Decontamination of equipment and stainless steel cladding or liners will be conducted by using water washing and spraying or ultrahigh-pressure water jetting, or other technologies listed in Section 11.3. Residues from these extraction operations will be collected, sampled as necessary, designated in accordance with WAC 173-303, and transferred to a TSD facility such as the LERF/ETF or the Central Waste Complex (CWC) for treatment, storage, and/or disposal.

Decontamination of intact protective coating surfaces on concrete to meet the clean debris surface standard will also be performed primarily through water washing and spraying. Additional technologies that may be used include chemical decontamination solutions, ultrahigh pressure water technologies, impact technologies such as sand blasting, CO_2 blasting, or other

new technologies that may be developed prior to closure. The protective coating on concrete is designed and applied to provide a durable, non-porous surface. The exposed surface protective coating is not concrete, although the underlying concrete supports it. If decontamination of the impermeable protective coating surface cannot be completed through chemical extraction, or if the protective coating has broken, cracked, or peeled away from the concrete, then at least 0.6 cm (0.24 inches) of the underlying concrete will be removed using one or more of the physical extraction technologies. The physical extraction performance standard for concrete is removal of 0.6 cm of the surface layer and treatment to a clean debris surface, as noted in the *Guidance for Clean Closure of Dangerous Waste Facilities* (Ecology 1994c), Section 5.8.

Metal surface areas of equipment that cannot be documented to meet the clean debris surface standard may be decontaminated using water washing, followed by a choice of chemical decontamination solutions, ultrahigh pressure water technologies, impact technologies such as sand blasting or other new technologies that may be developed prior to closure. Rinsate may be sampled and analyzed, using methods complying with *Test Methods for Evaluating Solid Waste, Physical Chemical Methods* (EPA 1986), for Ecology-approved indicator constituents. If other analytical methods are developed and chosen for use, the closure plan will be revised and submitted for approval. Indicators will be determined on the basis of process knowledge, the operating record, and waste characterization analyses, whenever possible.

Analytical data less than designation limits will indicate successful decontamination and attainment of the clean closure performance standard for the tank, piping, or other metal structures and equipment. Documentation of the representative character of the sample and laboratory quality control and quality assurance data will be entered into the closure record as specified in Sections 11.3.4 and 11.4.1. Concrete and protective coated concrete surfaces will not be addressed using designation limits.

If the metal structure or equipment cannot be considered decontaminated using the clean debris surface or designation limit criteria, or if further decontamination is determined to be impractical due to high radiation levels, waste minimization, cost considerations, or other reasons, it will be packaged using the debris treatment standard for immobilization by encapsulation. The waste will be designated on the basis of process knowledge, and transported to a permitted dangerous or mixed-waste disposal facility such as Hanford LLBG mixed-waste trenches. Examples of equipment that may undergo encapsulation and disposal include, but are not limited to:

- Tanks and pipe
- Melter off-gas duct work; scrubber, condenser, precipitator, and washout holding vessels
- Pumps, agitators, wash rings, and ejectors
- Air, steam, and water lines within unit containment areas

Contaminated items and solid decontamination residues removed from the WTP will be designated, packaged, and treated as necessary to meet the waste acceptance criteria of the receiving facility. Sampling of items and solid residues known to be contaminated and intended for disposal is not necessary if process knowledge is adequate to accurately designate the wastes

with the proper dangerous waste identification codes. The closure plan will be revised prior to closure and will address treatment and disposal plans in more detail.

11.2.3 Closure Standards for Tank Systems

At closure of a tank system, the owner or operator is required by WAC 173-303-640(8)(a) to remove or decontaminate waste residues, contaminated containment system components (such as liners), contaminated soils, and structures and equipment contaminated with waste, and manage them as dangerous waste, with few exceptions.

For the purposes of the WTP closure, the standard is interpreted to mean that each tank and associated ancillary equipment, including the secondary containment area, will meet the clean debris surface standard and/or designation limit criteria for rinsate. Indicator constituents or COCs to be used for rinsate evaluation will be determined using process knowledge, including consideration of the available waste characterization data, and other relevant information in the facility operating record.

Inspectable surfaces may be declared clean if they meet the definition of a clean debris surface, including concrete containment walls with intact protective coating surfaces, and physically-extracted concrete surfaces behind cladding breaches, or under abraded or loose protective coating that have had at least 0.6 cm of material removed from the original surface. Rough or inaccessible metal surfaces such as corroded tank containment area liner surfaces, or tank and pipe interior surfaces, may be declared clean when the decontamination solution sample is analyzed, with appropriate quality control and quality assurance as noted in Section 11.3.4, and the indicator parameter or COC data are determined to be less than or equal to the designation limits.

If decontaminating a tank system in place is not feasible or is ineffective, an alternative method is to remove the tanks, disassemble them, and decontaminate the tank parts using extraction technologies described under alternative treatment standards for hazardous debris (40 CFR 268.45). With Ecology's concurrence, the decontaminated debris can then be disposed of as non-dangerous (but possibly controlled as radioactive) waste, as indicated in Section 4.3 of *Guidance for Clean Closure of Dangerous Waste Facilities* (Ecology 1994c).

Tank systems will be inspected for compliance with the clean debris surface standard by observing the external and internal metal surfaces. Portions of a tank system that cannot be fully inspected (such as interior surfaces of tanks and attached piping, pumps, ejectors, and welded pipe connections or penetrations) or that may pose ALARA compliance problems, may be decontaminated with chemical or physical extraction technologies. The decontamination solutions from these portions of the system will be sampled and analyzed for indicator parameters, and the results will be compared to waste designation limits. Solid residues will be removed, containerized, designated, and disposed of at a permitted disposal facility as required. The tank or ancillary equipment, if not decontaminated to meet either clean closure standard, will be removed, treated as necessary, and disposed of in a permitted landfill. Treatment may include macro-encapsulation or micro-encapsulation, or other processes that comply with land disposal restrictions.

Standards for clean closure of tank system secondary containment are identical to standards for decontamination of containment areas for the container storage, containment building, and miscellaneous units, that is, clean debris surface standard and/or designation limits.

The proposed COCs will be submitted to Ecology with the revised closure plan to be submitted before the start of operations, and finalized in the revised closure plan to be submitted before the start of closure.

11.2.4 Closure Standards for Container Storage Areas

In addition to the requirements of WAC 173-303-610, WAC 173-303-630(10) requires that at closure, dangerous waste and dangerous waste residues will be removed from the containment system. Remaining containers, liners, bases, and soil contaminated with dangerous waste or dangerous waste residues will be decontaminated or removed.

Standards for clean closure of clad container storage secondary containment are identical to standards for decontamination of containment areas for the tank system, containment building, and miscellaneous units (that is, clean debris surface standard and/or designation limits). Special requirements for clean closure of several units with coated concrete floors were explained in Section 11.2.2.

11.2.5 Closure Standards for Containment Buildings

At closure of a containment building system, the owner or operator is required by WAC 173-303-645 (incorporating 40 CFR 264.1102(a)) to remove or decontaminate waste residues, contaminated containment system components (such as liners), contaminated soils, and structures and equipment contaminated with waste and leachate, and manage them as dangerous waste, unless WAC 173-303-070(2)(a)(ii) applies.

Standards for clean closure of containment building units are identical to standards for decontamination of containment areas for the tank system, container storage, and miscellaneous units (that is, clean debris surface standard and/or designation limits).

11.2.6 Closure Standards for Miscellaneous Units

The owner or operator is required by WAC 173-303-680 (2) to close miscellaneous units in a manner that will ensure protection of human health and the environment. The LAW and HLW melters will be removed and replaced several times during the operational life of the WTP. Removal and replacement are not considered closure or partial closure activities. Melters may be replaced according to the schedule based on the design life of the melter components, or replaced when unplanned failure of a component occurs. In either case, ancillary equipment will be removed or disconnected from the melter after molten glass has been removed to the maximum practical extent.

Openings to the LAW locally shielded melter (LSM) units will be mechanically closed, and they will be removed from the LAW vitrification building, after surface decontamination, as single containers.

Out of service HLW melters will be overpacked in a specially designed shield cover, then removed from the HLW vitrification building and placed in a melter storage building (a permitted container storage unit). During closure of the WTP, the out of service HLW melters will be dispositioned to meet disposal site waste acceptance criteria.

Out of service LAW and HLW melters may also be stored in the melter storage buildings if necessary to accommodate scheduling of treatment and disposal operations, or for other reasons. The melters will be encapsulated and shipped to permitted disposal facilities. Note that these events will not necessarily occur in this order; for example, encapsulation may occur at a location other than the WTP, after removal from the WTP. The operational standard to be met during these closure activities is to prevent releases of dangerous or mixed wastes to the environment.

The miscellaneous units will be housed in containment building units, the HLW melter cave, and the LAW LSM gallery.

Standards for clean closure of the miscellaneous unit secondary containment areas are the standards for decontamination of containment building units (that is, the clean debris surface standard and/or designation limits).

11.3 CLOSURE ACTIVITIES (I-1b)

This section describes closure activities that will be conducted to meet the clean closure performance standards. Details provided here may change, and if necessary, the plan will be revised to reflect those changes. The facility is scheduled to close at the end of its operating life. If the WTP is shut down prior to this time, an updated closure plan will be submitted. Full closure of the facility is planned. If partial closure is necessary, an updated closure plan will be submitted prior to initiating closure activities.

Section 11.3.1 describes the maximum extent of operations. Section 11.3.2 describes the process for removing dangerous (mixed) wastes from permitted units. Section 11.3.3 identifies several chemical and physical extraction technologies that may be used to achieve the clean debris surface standard. Section 11.6 describes how each of the four types of permitted units will be closed. The goal for closure of the WTP is clean closure, which is contingent on achievement of the clean debris surface standard or verification that indicator constituents in decontamination solutions from the units are not present in concentrations above designation limits. If contaminated soil is found, it will be removed until the remaining concentrations are less than or equal to the risk-based concentration limits based on industrial exposure factors.

Partial closure may be considered for the mixed-waste units; that is, one or more treatment processes or tank systems may be closed prior to the start of closure of the entire plant. Closure of a single unit or group of units could be necessary if a process were to be redesigned,

eliminating the previous functions of the units. Abnormal occurrences could also force partial closure, such as plugging of a tank or piping. Partial closures of the plant are not planned, but could result from unforeseen circumstances. The closure plan will be revised to address the specific details for the units if partial closure is necessary, and the revised plan submitted to Ecology for review, approval, and incorporation into the permit.

The following assumptions were made in developing the closure plan:

- The maximum inventory will be present approximately nine months or more before the start of the closure period. This is the case because of the batch nature of the entire WTP treatment scheme. The last transfer of waste feed from the DST system unit to the WTP may be as large as 1 million gallons. The treatment systems within the WTP will operate normally until the last portions of this final transfer are treated.
- The Pretreatment plant and the HLW melter will treat mixed waste and will be fully operational at the start of the closure period. These portions of the WTP will continue to operate during the closure period until the tank system flush solutions and residues are removed from each system to the maximum practical extent and treated before final decontamination begins.
- Operating records documenting the constituents and volumes of the wastes in the storage and treatment areas, and of the wastes previously processed through the facility, will be available. The operating record also will include detailed information on historical releases of wastes into secondary containment areas, previous decontamination work, and equipment that is present in containment areas. This information will be directly relevant to final detailed planning of decontamination steps and procedures, especially treatment and disposal of the decontamination solutions and residues that will be generated.
- A release of wastes outside permitted unit secondary containment areas will not occur.
- Equipment necessary for waste removal and equipment decontamination will be functional or can be repaired or replaced.
- Permitted TSD facilities will be available to receive dangerous and mixed wastes that will be generated during closure.

Overall Closure Approach

After the final waste feed shipment or inventory is processed, the LAW-LSM units will be closed and removed from the site. Tanks and piping will be flushed. The flush solutions will be treated in the Pretreatment building by filtration and evaporation, and concentrated solids will be immobilized in glass produced in the HLW melter. Immobilized waste may or may not be acceptable at the facilities that accepted standard ILAW and IHLW during the operating life of the WTP. Specific disposal plans for this type of waste may not be finalized until submittal of the final revised closure plan.

The next step in the overall closure approach is to decontaminate WTP unit components to the maximum feasible extent, and remove components that cannot be decontaminated, to meet the clean closure performance standards. Contaminated components will be disposed of, and the

residues and decontamination fluids remaining after treatment operations at the WTP have ceased will be transferred to the CWC, LERF/ETF or another Hanford Site permitted TSD facility. Other Hanford Site TSD facilities that may be considered for treatment or disposal of closure wastes in addition to the CWC and LERF/ETF include the LLBG and the Waste Receiving and Processing (WRAP) facility.

Vitrification treatment will not be available after the last melter is shut down, near the completion of deactivation work. Small quantities of feed waste or flushing residues may remain in tanks after the last melter is shut down, in addition to insoluble adhered coatings in piping and tanks. The remaining aqueous residues may have to be transferred to the LERF/ETF or the CWC for evaporation, precipitation, filtration, solidification or other treatment.

General Sequence of Closure Activities

The general sequence of activities necessary to close dangerous waste management units within the WTP, and the basis for establishing the order of performing these activities, is summarized in the following discussion:

Deactivation

- Dangerous waste removal: The nonradioactive dangerous waste will be removed from the WTP to minimize the possibility of release. Note: dangerous wastes may be generated at the WTP throughout the closure period from maintenance activities.
- Inventory removal: The mixed-waste inventory present in the WTP at the beginning of the closure (primarily heels in the bottoms of tanks) will be removed and processed (pretreated and vitrified) to the maximum practical extent. This removal will minimize the possibility for release and allow decontamination of the equipment to proceed. Implementation of the deactivation plan will remove the majority of the dangerous wastes from the WTP. Tank systems and equipment will undergo flushing as part of deactivation activities.

Decontamination

- Liner inspection: After removal of wastes (flushing), but before final decontamination of tanks and other units begins, each containment area will be inspected to identify potential or apparent breaks, cracks, or separation of the liner or protective coating from the concrete floors and walls. These locations (if any) will be mapped and documented, and sealed by welding or by application of patching or protective coating material, to prevent entry of contaminants during decontamination activities.
- Decontamination: Tank systems and other equipment in the permitted units will be decontaminated. Additional chemical or physical extraction may be performed before tank systems, piping, or the equipment and equipment support structures in the permitted units are removed. Extraction will be performed not only to meet clean closure standards detailed in Section 11.2, but also to minimize the amount of mixed-waste constituents that would be readily available for migration or release during equipment removal.
- Equipment may be left in place as clean-closed if it can be successfully decontaminated, and if DOE has determined that the equipment should stay in place.

Inspection

- Equipment inspection: Tank systems and ancillary equipment will be inspected to ensure that the clean debris surface standard and/or rinsate analyses designation limits are met. If necessary, the equipment will be identified as requiring removal, encapsulation, and disposal.

Removal

- Equipment removal: If the process equipment cannot be decontaminated to meet the closure performance standard, it will be removed, treated by encapsulation, and disposed at a permitted facility. Size reduction treatment may also be performed.
- Process Equipment decontamination: After the last batch of waste feed has been fully processed through the waste treatment plant, the LAW LSMs will be shut down and removed. Pretreatment process vessels and lines will be flushed with water or other solutions. Flushing liquids will be determined prior to initiation of closure activities, and if a liquid other than water is identified for use, the closure plan will be revised and submitted for approval prior to initiating closure activities. Flushing wastes will be treated in the Pretreatment evaporation, cesium and technetium removal, and ultrafiltration processes, then the concentrates will be transferred to a HLW melter. Water condensate will be routed to the LERF/ETF. Similarly, the HLW ultrafiltration system will be flushed to the LAW evaporator and ultrafiltration systems. One HLW melter will be operated after shutdown of the LAW LSMs to provide treatment for the solid flushing residues and evaporator concentrates. At the completion of treatment operations, the HLW melter will be emptied, cooled, overpacked, and removed. The HLW melters stored in the out of service melter storage building at the time of closure may be partially decontaminated, and/or reduced in size in the HLW melter cave, to the degree necessary to meet disposal facility waste acceptance criteria (Section 11.3.3). LAW LSMs are not expected to require decontamination or size reduction treatment, other than surface decontamination after the operating equipment openings are closed. Partially decontaminated and/or size-reduced out of service HLW melters will be overpacked, encapsulated, and shipped to a permitted disposal facility.

Structure Decontamination

- Building structure decontamination: stainless steel-lined containment areas: Liners in the permitted unit containment areas will be decontaminated using chemical or physical extraction technologies, or both. Most of the secondary containment areas in the process buildings will be lined with stainless steel cladding. Coated concrete walls and ceilings (above cladding) will be decontaminated using only chemical extraction technologies, unless the protective coating is damaged or deteriorated. Damaged protective coating areas, and contaminated concrete under or behind liner breaches, will be decontaminated using physical extraction technologies. Decontamination solutions may be sampled to determine treatment requirements and transferred via existing pipelines to the LERF/ETF if they meet the LERF/ETF acceptance criteria. The level of radioactivity of some waste solutions may be above maximum limits for the LERF/ETF, and the waste may be transferred to another permitted Hanford TSD unit. Structure decontamination activities are described in Section 11.3.3.

- Building structure decontamination: concrete containment areas: Examples of units that have coated concrete secondary containment without stainless steel cladding include the condensate tank system, the LAW LSM gallery, ILAW container finishing line and ILAW container fixative containment buildings, and several secondary waste container storage areas. Of these, only the dangerous waste container storage area, and possibly the Central Waste Storage Area, are expected to routinely store containers holding liquid wastes. At the time of closure, the facility operating record will be reviewed and each unit will be inspected to determine if releases of wastes from containers have occurred in these areas. If a release of dangerous waste has occurred on a concrete floor where the protective coating is even slightly damaged or deteriorated, the concrete in that area will be physically extracted to remove at least 0.6 cm of concrete from the original surface. This effort will demonstrate compliance with the clean debris surface standard. If a release is not documented or suspected, minor or hairline cracks may still be accepted in determining that the clean debris surface standard is met. If the protective coating is intact, the surface may be decontaminated by chemical extraction. If chemical extraction is unsuccessful, or if the coating is damaged by the chemical extraction, physical extraction will be performed.
- Building examination to verify decontamination: After each unit in each building has been decontaminated, the units will be inspected and closure documentation will be examined to verify that the clean closure standards have been met.

Soil Investigation, Removal, and Verification

- Potentially contaminated soil identification: Areas in which soil could have become contaminated, that is, areas in which liners and/or concrete have lost integrity, will be mapped during the liner or concrete containment area inspection and decontamination process. Soil sampling protocols will be established and implemented if potentially contaminated areas are identified.
- Soil decontamination: Soil removal will be performed if necessary. A revised closure plan and a post-closure plan will be submitted if removal to the established risk-based standards is not feasible.
- Soil sampling to verify decontamination for indicator constituents: The soil will be sampled and analyzed for indicator constituents after the contaminated soil has been removed.

Disposition of Decontamination and Containment Wastes

- Disposition of decontamination fluids: Wastewater or chemical extraction solutions from decontamination activities will enter an existing collection system for waste characterization and verification against LERF/ETF waste acceptance criteria. At the final stage of closure, when the transfer pipeline to the LERF/ETF is taken out of service, decontamination solutions may be containerized and transported to the LERF/ETF by truck. Characterization of the closure residues in the units will be documented based on process knowledge or analysis of the waste treated in the units. The waste will be transferred to LERF/ETF for treatment if appropriate. If the wastewater cannot be accepted by LERF/ETF, it may be solidified and transferred to the CWC or another available permitted unit.

- Disposition of air emission control equipment: Air emission control equipment will remain in place until decontamination of other WTP components meets the clean closure performance standards. The air emission control equipment will be decontaminated to meet the clean closure performance standard, or will be removed, designated, and packaged to meet the waste acceptance criteria of a permitted disposal facility.
- Disposition of decontamination equipment: Equipment or materials used in performing closure activities will be decontaminated or disposed of at a permitted disposal facility. Personal protective equipment will be disposed of at a permitted disposal facility.

The general order of closure activities was selected to minimize the potential for release of mixed-waste constituents by removing the bulk of the mixed-waste constituents early in the closure process. This order of closure also minimizes waste generation by reducing the possibility that decontaminated areas will become contaminated again by ongoing closure efforts.

Detailed scheduling of closure activities depends on the necessary facility functions required to be maintained during the closure period, and the degree of contamination in each unit, especially after the waste inventory is removed and decontamination activities start. The large number of tank systems increases the potential for a highly complex schedule. Similar tank systems and other types of units will be grouped for the purpose of minimizing the bulk and complexity of plans for closure activities. The detailed decontamination operations schedule will be included in the revised closure plan to be submitted before the start of closure activities (see Section 11.7)

Work will be performed in a manner that ensures worker exposure to dangerous and/or mixed waste, radioactivity, hazardous chemicals, or other workplace hazards will be ALARA.

Additional detail will be provided describing waste removal, equipment decontamination, and closure-generated waste disposal activities in the revised closure plans to be submitted prior to closure.

11.3.1 Maximum Extent of Operations (I-1b(1))

The maximum extent of operations during the active life of the WTP corresponds to the maximum waste inventory with full feed tanks, the melters operating at design capacity, and full storage areas.

The general arrangement drawings in Chapter 4A of this application show the location of tanks, melters, containment buildings, and storage areas. The dimensions of the dangerous waste management units are shown in tables in Chapter 4 of this application.

11.3.2 Removing Dangerous Waste (I-1b(2))

The waste feed inventory present in the WTP after the final receipt of waste feed from theDST system unit will be processed before the start of the first phase of closure. The waste will be removed from tank systems to the maximum practical extent. Removal will be continued by processing the last bulk volumes of waste feed through the applicable pretreatment and

vitrification systems, and transferring treated ILAW and IHLW to other TSD units or facilities from the container and canister shipping docks. These activities will follow normal operating procedures.

The following description of waste removal is intended to provide a brief overview of the deactivation and closure activities.

At the completion of waste operations, DOE and its contractor will deactivate the waste facilities and their contents. Deactivation, when completed, will leave the facilities in a safe, stable, and passive state that can be monitored with minimal cost and minimal requirements for service support from either personnel or active equipment.

Deactivation operations will comprise a large portion of the closure activities that will occur between the start of the closure period, as defined in WAC 173-303-610(3)(c)(ii), and the final shutdown of the HLW vitrification system. Deactivation and the first half of the closure period will overlap, and will contribute to completing closure activities in accordance with WAC 173-303-610. Deactivation operations for some units may begin before the completion of treatment of the final batch of waste feed from the DST system unit.

Overlaps between dangerous waste unit closure and deactivation activities, and the overall treatment, storage, and disposal facility permitting process, as defined in the *Hanford Federal Facility Agreement and Consent Order* (Ecology, EPA and DOE 1998) and the implementing attachment known as the *Tri-Party Agreement Action Plan*, Section 6.2, are illustrated in Figure 11-4. The full extent of necessary interfaces, and detailed definition of the intermediate points in this timeline, will not be determined until deactivation and closure planning are finalized before the start of closure.

Vitrified waste in storage at the WTP at the start of the closure period will be shipped to disposal units on the Hanford Site or to other appropriate facilities. If the inventory of untreated waste feed cannot be treated at the WTP, it will be transferred to a permitted TSD facility. Circumstances under which the waste feed inventory would not be treated through vitrification are not accounted for in this closure plan and would require revision of the plan. Properly completed shipping papers and certifications, as applicable, will accompany waste shipments.

Once the final batch of waste feed has been processed, residual heels will be flushed from the tank systems in accordance with deactivation procedures. Wastewater from flushing and decontamination solutions will be filtered, evaporated, and further treated as necessary in the WTP Pretreatment building. The removed solids will be sent to the HLW melter. Wastewater will be sent to the LERF/ETF for treatment if acceptance criteria is met, or it will be transported to the CWC or another permitted TSD unit for storage, treatment, and disposal. Treatment in containers could be performed at the WTP if necessary or preferable, and if the resulting waste will meet the CWC or another TSD unit's waste acceptance criteria. The treatment in containers alternative is not likely to be used, due to the relatively large volumes of flush solutions that will be generated.

If non-mixed dangerous waste is present as inventory at the start of the closure period at the dangerous waste container storage unit, it will be transferred to a permitted off-site facility for treatment or disposal. Non-mixed dangerous waste generated during the closure or deactivation work will be managed similarly.

The units that the wastes will be sent to cannot be predicted at this time because the specific types of dangerous wastes that may be present cannot be determined. The TSD units available at the time of closure, and their waste acceptance criteria, may be very different than those available today.

Complete records will be kept as to the date of shipment, waste characterization, waste quantity, destination facility, land disposal restriction certifications and notifications, and other appropriate information for removed waste. Specific documentation requirements are discussed in Appendix 3A of the application. This information will be included in the closure documentation supporting certification, which is described in Section 11.4.1.

The specific types of off-site treatment and disposal units for dangerous wastes generated during closure will be determined and provided in the revised closure plan to be submitted before closure begins. Interfaces with the DST system unit and LERF/ETF will be specified in the revised plan to be submitted before the start of closure.

11.3.3 Decontaminating Structures, Equipment, and Soils (I-1b(3))

The only structures and equipment that are expected to be contaminated at the start of the closure period are within the permitted unit containment areas. Some of the types of waste handling equipment that may be located in each unit can be determined by review of the design drawings and operating plans in this application. Examples include, but are not limited to, cranes, power manipulators, and welding machines. Many other types of hand tools, instruments, lights and cameras, radiation monitors, buckets, and other equipment may be present in one or more unit containment areas.

Contaminated structures and equipment will be decontaminated, if feasible, using one or more of the following technologies to achieve the clean closure performance standard:

- Ultrahigh-pressure water jet
- Rotating cavitation water jet
- Soap scrubbing and wet vacuuming
- Steam vacuuming
- Vacuum abrasive blasting
- Soda blasting
- Shot blasting
- Ice blasting
- Hydroblasting

- Grit blasting
- Cryogenic CO_2 pellet blasting
- Sponge blasting
- Etching
- Rotating brushes/honing

More aggressive decontamination methods may be used on concrete if it becomes necessary to remove waste accumulations that extend into the concrete:

- Needle scaler
- Paving breaker or chipping hammer
- Piston scabbler

These decontamination technologies were chosen based upon demonstrated effectiveness in a radioactive environment and the ability to successfully achieve the closure performance standard. These technologies are covered under the generic physical or chemical extraction technology categories listed in 40 CFR 268.45, Table 1. This approach is consistent with Ecology guidance (Ecology 1994c) to achieve clean closure.

Specific methods of decontamination (and removal and disposal if required) for the unit components and equipment will be determined at the time of closure. These methods will be based on information in the operating record, existing radiation levels, and DOE plans for future use of the buildings. The feasibility, or practicality, of decontamination depends on many factors that cannot be fully defined until the closure plan is finalized. Decision criteria may include, but are not limited to, radiation hazards, secondary waste volumes, schedule and budget restrictions, and availability of TSD facilities to receive secondary wastes. Equipment and debris that are not decontaminated will be disposed of as mixed waste.

Decontamination solutions from interiors of tanks, attached piping, and other equipment will be collected in tank drain piping and collection tanks. Decontamination solutions from tank and pipe exterior surfaces, and from decontamination of other free-standing ancillary equipment and secondary containment walls, ceilings, and floors in the four types of units will be collected in containment area sumps, then transferred by pumping or gravity drainage to plant wash collection tanks. Exceptions to this procedure may include decontamination of small surface areas where drainage may be captured in portable collection basins or buckets. Transfers of decontamination solutions to the LERF/ETF, CWC or another on-site TSD unit, or if the waste is non-mixed, to an off-site TSD facility, are addressed in Section 11.3.2.

The decontamination solutions and residues will be designated on the basis of process knowledge, or sampling and analysis if necessary, and transferred by existing hard piping to the LERF/ETF. The pipe connection to the LERF/ETF will be one of the last WTP components to be taken out of service, after decontamination activities are complete. The last few

decontamination activities may require the collection of wastewater in a temporary sump and container, and will be transported by truck to the LERF/ETF.

Solid residues will be collected into containers by vacuuming or mechanical means (such as sweeping or shoveling), treated, if necessary, at the WTP, CWC, or WRAP to stabilize or solidify the residues, and disposed in the LLBG or a permitted disposal unit on the Hanford Site. Off-site mixed-waste landfill disposal facilities, such as Envirocare of Utah, may be considered if an appropriate Hanford Site unit is not available.

Contaminated debris and solid decontamination residues removed from the WTP will be designated and packaged to meet the waste acceptance criteria of the receiving facility. Sampling of equipment and solid residues that are known to be contaminated and are intended for disposal is not necessary, if process knowledge is adequate to accurately designate the waste with the proper dangerous waste identification codes. Process knowledge includes the operating record, which should provide adequate waste analyses and waste processing histories for each unit in the WTP.

An interface team is investigating options for the disposal of out of service melters. Information to support disposal of melters and other debris will be provided in a revised closure plan to be submitted before the start of closure.

11.3.3.1 Structures and Associated Equipment

Within most of the process areas, stainless steel liners or cladding supported by steel reinforced concrete structures provide secondary containment for the process tanks, immobilized waste containers, HLW melter, and ancillary equipment. Coated concrete surfaces (the walls and ceilings above the liners) in lined or cladded waste management areas are not part of the required dangerous waste secondary containment structure, although additional containment may be provided for splashes and airborne contamination. Concrete in cladded units, where containment of splashes, washdown sprays, or airborne contamination is necessary, will be coated during construction with a durable chemical-resistant impermeable protective coating. Top edges of the liner plates in these units will be sealed to the concrete surface.

The container storage areas for secondary wastes are discussed in Section 11.2.2. The LAW LSM gallery containment building, the ILAW container finishing line containment building, the ILAW container fixative containment building, and the Pretreatment plant condensate tank system, are examples of the permitted units at the WTP in which the concrete floors will not be provided with cladding. (The ILAW container finishing line unit will have floor and wall cladding only in the container decontamination portion of the unit.) The floors and portions of some walls in these units will be coated. In the miscellaneous secondary waste container storage units, additional secondary containment is conditional. Most waste containers to be stored in these units will contain no free liquids, and therefore will not require secondary containment for liquids. The waste containers that contain free liquids will be provided with portable, individual, polyethylene containment structures or sumps.

Steel liners and coated concrete surfaces will be inspected visually and surveyed radiologically before final decontamination (or after, if the pre-decontamination radiation levels are too high, precluding useful gamma camera data). The visual inspection may be conducted remotely using CCTV with a zoom lens. The purpose of the inspections will be twofold: to identify and map cracks that might provide a migration pathway for contaminants; and to identify areas that are potentially contaminated with mixed waste or waste residues. A gamma camera will identify areas where contamination has infiltrated behind the cladding.

Identified cracks will be sealed to prevent infiltration of decontamination solutions between the stainless steel liner and the concrete, or migration into cracks in concrete. Coated concrete and liner surfaces will be decontaminated to achieve the clean debris surface standard using chemical extraction, or if necessary, through physical extraction as described in Section 11.2.

Concrete surfaces are eligible for decontamination by chemical extraction only if the protective coating is intact. Minor cracking in the protective coating will not disqualify the concrete surface from being eligible for classification as a clean debris surface, if that surface has not been directly exposed to dangerous waste as a result of a container leak or some other release mechanism. The facility operating record will be consulted before decontamination work begins to identify units where leaks or other waste releases have occurred. These units will also be physically inspected to determine whether the protective coating is intact, and whether undocumented evidence of a waste release is present.

Intact protective coatings may be decontaminated with water washing if necessary. If additional decontamination is necessary, other technologies will be used, such as chemical decontamination solutions, ultrahigh pressure water technologies, impact technologies such as sand blasting, CO_2 blasting, or other new technologies that may be developed prior to closure. Physical extraction methods that remove up to 0.6 cm of concrete will be necessary on concrete surfaces where the protective coating has peeled, bubbled, or is broken (before or after decontamination), exposing bare concrete. Cladding may also require physical extraction treatment to remove waste residues or corrosion. Inspections of the concrete and liner surfaces for a clean debris surface will be documented in an inspection record. Details of the decontamination methods to be used will be developed and submitted for approval prior to initiating closure activities.

Concrete and steel grinding, scaling, or scabbling residues will be collected, placed in containers, and sampled and analyzed for indicator parameters; or the residues will be designated based on knowledge of the process or the waste that contaminated the concrete or steel.

The operating record will be reviewed prior to closure to determine if decontamination procedures should be performed in any areas outside the permitted unit secondary containment areas. These areas may include equipment decontamination bays or containment sumps in transfer tunnels, or other locations where wastes may have been generated or transferred during the operating life of the WTP. A final revised closure plan that includes areas identified as a result of the operating record review will be submitted to Ecology for review and approval before closure starts. Floors and walls in non-process areas of the building (such as offices, lunch rooms, or bulk storage areas for non-hazardous materials) will not undergo

decontamination activities unless there is evidence in the operating record that chemical spills or other occurrences may have contaminated interior surfaces of the rooms.

11.3.3.2 Air Emission Control Equipment

Air emission control equipment will remain in place and in operation as necessary to facilitate deactivation and decontamination of the WTP. Equipment will be taken out of service in stages as contamination is progressively removed or reduced. Compliance with applicable air emission standards will be maintained. Air permits for operations will be evaluated to determine if they will support closure activities. The permits will be modified if necessary.

Condition II.W.3 of the Hanford RCRA Permit requires that air emissions from TSD units subject to the permit shall comply with applicable state and federal regulations pertaining to air emission controls. The applicable regulations include but are not limited to the following: WAC 173-400, *General Regulations for Air Pollution Sources*; WAC 173-460, *Controls for New Sources of Toxic Air Pollutants*; and WAC 173-480, *Ambient Air Quality Standards and Emission Limits for Radionuclides*.

Uncontrolled emissions will be prevented by continued operation of the vessel and process cell ventilation systems, and melter off-gas control systems, as necessary throughout the performance of closure activities for those units, and by maintenance of containment structures and procedures. After completion of decontamination operations that may generate fumes, vapors, or dust that will be controlled by the ventilation system, the air emission control equipment will be decontaminated, then dismantled and reduced in size to the extent necessary to facilitate preparation for disposal. DOE may determine that the equipment will remain in place after closure.

Modifications to air emission standards or other appropriate standards to prevent or minimize the release of dangerous waste or dangerous waste constituents to the air or surrounding environment during closure will be specified in the revised closure plan to be submitted before the start of closure.

11.3.3.3 Soil

Discovery of an apparent or potential breach in a cell liner, or in the protective coating in unlined units, on an exterior wall or bottom floor adjacent to soil, will require further investigation. The presence of soil contamination will be a unit-specific determination based on WTP records and direct visual or CCTV inspection and gamma camera survey of the stainless-steel liners and concrete surfaces, as described in Section 11.2. The liner will be removed to allow access for additional investigation and decontamination if this inspection reveals areas of poor liner integrity such as severe corrosion, weld breaks, or other damage to the steel. Coring and soil sampling will be performed if a liner breach or damaged protective coating is found on a wall or floor adjacent to external soil, and if the concrete has lost integrity at that location. If the concrete is not cracked, deteriorated, or porous, and a clean debris surface can be obtained by physical extraction treatment, no further investigation may be necessary. Data from radiation surveys may be useful at such locations to support decisions to continue or terminate further

investigations such as coring the concrete and sampling exterior soil. If soil is sampled, it will be analyzed for indicator constituents of concern identified on the basis of the wastes contained in that unit during the operating life of the plant.

If soil having levels of contamination that exceed the risk-based soil cleanup levels is found, it will be removed and managed as media containing dangerous waste, and will be designated and disposed of accordingly at a permitted disposal facility. Soil at the limits of excavation will be sampled and analyzed after removals are completed to confirm that the concentrations of dangerous waste constituents are below the risk-based industrial exposure limits. The appropriate risk-based clean-up standard will be consistent with the future land-use classification from the *Final Hanford Comprehensive Land-Use Plan Environmental Impact Statement* (DOE 1999). The project could propose to revisit the clean-up standard at the time of closure to see if another standard is reasonable. Risk assessment principles will be used to establish clean closure concentration limits for soils in accordance with WAC 173-303-610(2)(b)(i).

11.3.4 Sampling and Analysis to Identify Extent of Decontamination/Removal and to Verify Achievement of Closure Standard (I-1b(4))

If there are cladding breaches or concrete that has lost integrity, efforts to define the extent of contamination will use a graded approach using field screening and survey with a portable detector followed by verification sampling if needed. This section is an outline for a sampling and analysis plan (SAP) that describes the approach that will be followed for verification sampling. The sampling and analysis plan will also assist in confirming that decontamination and/or removal activities have attained the closure performance standard. Sampling may be employed where the clean debris surface standard cannot be met, such as interior tank and pipe surfaces, or where evidence is found indicating apparent failure of permitted unit secondary containment such as liner cracks. The SAP cannot be finalized at this time because the dangerous waste COCs at each unit, and restrictions on sampling and analysis activities due to high radiation levels, are not adequately defined. Prior to closure, this closure plan will be revised to specify sampling and analysis techniques in a site-specific SAP.

11.3.4.1 Sampling to Determine Extent of Contamination (I-1b(4)(a))

The SAP will be prepared to evaluate the extent of soil contamination and the effectiveness of decontamination at specific units in the WTP when needed. This section discusses the design and outline of the sampling program. Subjects addressed in this section will be detailed in the revised closure plan and in the SAP prior to commencement of closure. Additional information concerning investigation tools such as the gamma camera, CCTV, and other analytical or survey equipment will also be included in the final closure plan. The subjects addressed in this section include analytical parameters, sampling activities, and data quality.

Sampling Objectives

Sampling may be conducted to evaluate the extent of contamination and the decontamination effectiveness at the WTP. Media anticipated to be sampled during closure of the WTP include rinsate from tank systems and ancillary equipment that does not meet the clean debris surface standard for inspection (inaccessible areas), and soil at suspected release locations. Concrete

may be sampled if necessary for waste designation purposes. Sampling may be conducted following decontamination of the interior surfaces of process cells. If there is required sampling under structures, it will be conducted in a manner that minimizes disturbance of underlying soil.

If relatively high radiation levels are found in soil or on interior surfaces of equipment, sampling may not be practical due to potential worker exposure or laboratory contamination concerns. In such cases it will be assumed that further decontamination or removal work will be performed to approach the dangerous waste clean closure standard, and sampling will not be performed until radiation levels are reduced. The expected co-contamination of equipment and soil by both radionuclides and dangerous waste constituents is not a proven fact, and the actual ratio between the two types of contaminants will vary widely. However, the proposed approach is conservative in assuming significant dangerous waste contamination wherever radionuclide contamination is found.

Sampling tasks in areas of suspected contamination (such as cladding breaches) and areas in which clean-closure demonstrations may be needed are as follows:

- Select biased or "focused" sample sites, based on review of the unit operating record, cladding breach investigations and underlying concrete decontamination work and evaluations; or based on interior inspection data (for example, from video, CCTV, or radiation surveys) for tanks, pipe, or other ancillary equipment.
- Obtain samples from specified areas, focusing on the locations of apparent highest concentrations. For soil, these locations will be immediately adjacent to or below cladding breaches or cracked or deteriorated concrete. The sample locations could theoretically expand extensively, as necessary to determine the limits of the volume of soil contaminated at concentrations above the risk-based limits. For tanks, piping, or other equipment, the locations to be rinsed and sampled will include apparent or likely waste accumulations in crevices, connections, or other rough or restricted flow locations such as inlets or outlets. The rinse sample will be taken from the first rinse, obtained within a reasonably short time after the completion of decontamination efforts, to avoid drying of potentially contaminated surfaces.
- Conduct analyses of samples
- Evaluate results for closure, and provide feedback to the closure project management team. Documentation of analyses and the resulting decisions (for example, clean closure is complete, or more decontamination or removal work will be done) will be included in the record of closure activities.

Analytical Parameters

Analytical parameters, methods, and specific analytical and sampling procedures will be based on knowledge of the operations and wastes processed (process knowledge) in the WTP.

A list of indicator constituents will be developed based on potential COCs and the closure performance standard (designation and/or risk-based limits). These indicator constituents and associated analytical methods will be provided in the updated closure plan prior to initiation of

closure. The analyses will follow the methods described in *Test Methods for Evaluating Solid Waste, Physical Chemical Methods* (EPA 1986) and/or other approved methods. Target practical quantitative limits will be established at a minimum of one order of magnitude less than the specified decontamination standard.

Sampling Methods

Sampling will be performed in a manner consistent with EPA guidelines in the *Quality Assurance/Quality Control Guidance for Removal Activities: Sampling and QA/QC Plan and Data Validation Procedures, Interim Final* (EPA 1990), *Sampling and Mobile Laboratories Procedures* (WMFS 1998), *Guidance on Sampling and Data Analysis Methods* (Ecology 1995), or other appropriate references. If evidence or knowledge of spills, or if a failure of secondary containment exists, biased sampling will be conducted in accordance with applicable requirements of *Test Methods for Evaluating Solid Waste, Physical Chemical Methods* (EPA 1986). Biased samples may be taken, as needed, from equipment or locations that cannot be visually verified to meet the clean debris surface standard. Some area-wide sampling may be conducted in larger areas of suspected contamination. The area-wide sampling will be performed in accordance with *Guidance for Clean Closure of Dangerous Waste Facilities* (Ecology 1994c).

Specific sampling methods appropriate to the media to be sampled will be provided when the closure plan is revised and the SAP is prepared prior to closure. Decontamination solutions or water rinsate and soils are examples of the media that may be sampled. Concrete and other materials are not expected to be sampled unless analyses are required for determining the correct waste designation or for cleanup/decontamination confirmation. For waste characterization or designation purposes, representative samples of concrete rubble will be taken after removal from the structure. This approach may be changed if significant volumes of concrete are suspected to be contaminated.

Sampling Locations

Tank and pipe internal surfaces will be visually inspected if feasible, and radiologically surveyed to identify potentially contaminated areas before sample collection. These areas will be identified and documented as part of the closure record, and biased sampling by application of rinse solution will be performed in these areas. Samples of rinsate may be obtained from decontamination of equipment at other locations that cannot be visually verified to meet the clean debris surface standard. Biased soil sample site locations will be determined by previous inspections during or after initial decontamination activities, liner removal and concrete decontamination physical extraction activities at cladding breach locations. Soil sampling could also be necessary at one or more of the container storage buildings that have concrete floors. Soil sampling locations at these units will be at through-thickness cracks or where the concrete has otherwise lost integrity, and a spill, container leak, or other release is known or suspected to have occurred at that location.

Sampling Equipment, Containers, and Preservation

The sampling equipment used will be appropriate to the different media that may be encountered. The list of criteria used for determining appropriate sampling equipment will be

developed using state and federal guidance, and submitted for approval prior to initiating closure activities. Sampling will be performed in a manner consistent with EPA guidelines in the *Quality Assurance/Quality Control Guidance for Removal Activities: Sampling and QA/QC Plan and Data Validation Procedures, Interim Final* (EPA 1990), *Sampling and Mobile Laboratories Procedures* (WMFS 1998), *Guidance on Sampling and Data Analysis Methods* (Ecology 1995), or other appropriate references. Sample equipment and supplies will be procured as required to perform necessary sampling. Specialized sample collection apparatus for taking samples of rinsate from equipment will be specified in the SAP in the revised closure plan to be submitted to Ecology before the start of closure activities.

Sample containers will be selected based on their compatibility with the samples, types of analyses to be performed, resistance to leaking or breakage, ability to seal tightly, and the required volume for an optimum sample, in accordance with protocols in SW-846 (EPA 1986). Deviations from these protocols will be documented and proposed to Ecology in accordance with WAC 173-303-110. Deviations will be proposed only in cases where compliance is impractical or would conflict with other requirements, such as ALARA. Any such anticipated deviations will be proposed in the revised closure plan to be submitted to Ecology before the start of closure of the WTP. Containers for collecting and storing samples will be made of high-density plastic or glass appropriate for the constituents to be analyzed. The containers will have tight, screw-type lids, with Teflon™ cap liners for glass bottles.

Sample labels will be prepared according to the procedures outlined in SW-846 (EPA 1986). Labels with unique identification will be securely attached to each sample container to prevent misidentification. The labels may be adhesive or tags, and will be affixed to the proper sample containers before or at the time of collection. Information will be completed as close as possible to the time of collection. Each label, or an associated record, will contain at least the following information:

- Site contractor
- Collector's name
- Date and time collected
- Sample number
- Sample location
- Analyses to be performed

Samples will be preserved, as appropriate for the analytical method, packaged according to EPA sample handling procedures, and packed in a cooler maintained at 4 °C ± 2 °C (39 °F ± 3.6 °F) immediately after collection unless specified otherwise in the SAP. Samples will not be held in excess of specified holding times in accordance with the SAP.

Because the samples will be collected from radiation zones, the samples will be checked by a radiation control technician prior to removal from the WTP or shipment to the laboratory. A dose assessment will be conducted for those sampling activities occurring in radiation zones.

The dose assessment will be used to develop a plan to keep doses ALARA during sampling activities. This assessment will be performed in a manner that will not compromise the validity of the sample.

Seals on the sample containers, and on the sample shipment coolers, will be used to prevent or detect tampering with samples between the time of collection and the beginning of analysis. Seals will be applied to the sample containers and coolers before leaving the sample location. The seals will be attached in such a manner that the seal will be broken to open the container.

Chain-of-Custody Record

Ensuring the integrity of the samples, from collection through analysis to final disposition, will be accomplished by utilizing documentation, in the form of a chain-of-custody record, to trace sample possession and handling history of people having custody of the sample.

The chain-of-custody record will be completed and will accompany samples from collection to analysis. Multiple copies of the record will be required, and the sampling supervisor will maintain at least one copy.

Samples will be tracked in the chain-of-custody record and will remain under one of the following conditions:

- In a person's physical possession
- In view, after being in physical possession
- Secured so that it cannot be tampered with, after having been in physical custody
- Placed in an area restricted to authorized personnel

The following information will be included in the chain-of-custody record:

- Sample number
- Date and time collected
- Medium sampled
- Sample type, grab or composite
- Analyses to be performed
- Number of containers
- Contractor's name
- Collector's signature
- Signature of person receiving possession
- Inclusive dates of possession
- Condition of samples on receipt

Sample Quality Control

Sample quality control procedures will be followed, including proper implementation of the sample labeling, sample sealing, and chain-of-custody completion described in the preceding paragraphs. Field quality control sampling described in this section will also be followed. Sample quality control procedures will be implemented to adequately control sampling activities.

Field quality control will be accomplished through the use of duplicate samples and equipment and field blanks. The quality control samples will be collected once every 20 samples, or a minimum of once a sample event.

Duplicate samples are two separate samples taken from the same sampling point in the field and placed into separate containers. The duplicates will be used as an indication of the field homogeneity and repeatability of the analytical data. Split samples will be collected along with duplicates. Split samples will be analyzed at a separate, independent laboratory.

Equipment blanks serve as a check on sampling device cleanliness. An equipment blank consists of a sealed container of distilled water that is transported to the site, opened in the field, poured over or through the sampling collection device that has been decontaminated, and then is collected in a sample container and returned to the laboratory for analysis. The analytical results from the blanks will be used to assess the adequacy of sampling device decontamination procedures. This assessment is made during data validation. Equipment blanks will be collected daily and analyzed for the same analytes as the samples collected that day.

Field blanks consist of pure deionized water or reagent sand that will be transferred to a sample container at the site and preserved appropriately. Field blanks are used to check for possible contamination with the reagent or the sampling environment, and will be collected daily. Trip blanks will accompany volatile organic analysis samples.

Data Quality

Quality of samples will be ensured through the collection of field quality control samples and through strict adherence to sample labeling, sample sealing, and chain-of-custody procedures. Data quality will be ensured by adherence to the analyte-specific requirements for precision, accuracy, completeness, and representativeness that will be prescribed in the SAP. The laboratory performing the analyses will be required to meet these specific quality assurance objectives in the SAP, in addition to meeting the guidelines of their quality assurance plan. The quality control of records and documentation will be accomplished by following procedures outlined in US EPA SW-846, as amended (EPA 1986). Sampling and analysis records will be kept on file, including the following:

- Field notes
- Chain-of-custody records
- Daily memoranda
- Laboratory results
- Quality assurance
- Data validation results

- Records of meetings
- Activities concerning the sampling program

Evaluation and Reporting of Data

Analytical results from the WTP sampling will be compiled, evaluated, and summarized in the following manner:

- Evaluate the quality control of the sample handling and sample analyses to assess the reliability of the data
- Conduct the statistical evaluation of the analytical data
- Examine results for comparison with accepted regulatory standards on an indicator constituent-by-indicator constituent basis
- Prepare summary statistics for indicator constituents
- For each constituent identified, compare the sample results with the established designation limit or soil cleanup levels, and, for soil, with the established background levels for soils. Sample concentrations below background, but above risk-based closure levels, may be proposed as adequate demonstrations of clean closure, pending Ecology approval.
- Prepare a report that includes data analysis and assessments that evaluate whether the levels of various indicator constituents present a health or environmental concern, and whether they meet the clean closure performance standard. The report will include sample locations, number of samples, specific methods used for collection, data quality assessment, and differences in procedures or sample locations from those provided in the revised closure plan and the SAP, as applicable. The report will provide clean closure evaluations. Each report may address only a single sample or a large group of samples. A single unit at the WTP may require several sampling campaigns and iterative reports, while other units may require no sampling.

Safety Procedures and Equipment

Safety procedures will be detailed in a site-specific health and safety plan that will be included in the revised closure plan to be submitted to Ecology prior to initiation of closure activities. A detailed safety review of the closure tasks and personnel safety will also be conducted prior to beginning the closure activity. Personnel performing closure activities, including sampling, will wear personal protective equipment, as required, to prevent exposure to hazardous materials and dangerous and mixed-waste constituents.

Additional information, as follows, will be provided in the revised closure plan to be submitted prior to closure:

- Health and safety plan
- Details on sampling equipment
- COC indicator parameters for decontamination solution analyses
- Analytical methods that deviate from SW-846 (EPA 1986), if any

- Sampling and analysis plan

11.3.4.2 Sampling to Confirm Decontamination of Structures and Soil (I-1b(4)(b))

Sampling of decontamination solutions may be conducted for equipment, structures, and debris that do not meet the clean debris surface standard following the decontamination process. This sampling will serve to define the extent of remaining contamination and confirm adequate decontamination of equipment, structures, or debris. The sampling process will be repeated after each subsequent round of decontamination effort until the decontamination effort is either determined to be successful, or is terminated, and the contaminated component is removed and disposed of as dangerous or mixed waste.

Soil found to be contaminated will be removed as part of the closure activities, and sampling will be performed to confirm that levels of contamination in the remaining soil do not exceed Ecology-approved risk-based soil cleanup levels.

11.4 OTHER ACTIVITIES (I-1b(5))

This section describes the procedures to be followed in order to comply with closure certification requirements, to control run-on and runoff during closure, and to reuse equipment from the plant.

11.4.1 Certification of Closure

WAC 173-303-610(6) requires that within 60 days of completion of closure of the WTP, a closure certification will be submitted to Ecology. Following completion of closure, DOE (or the DOE-selected contractor) and an independent Washington state registered professional engineer will submit certifications that the mixed-waste units have been closed in accordance with the approved closure plan. The certifications will be submitted to the Hanford permit coordinator at the following address:

Washington State Department of Ecology
Kennewick Office
Attn: Hanford Permit Coordinator
1315 W. 4th Avenue
Kennewick, Washington 99336-6018

The following documentation will be prepared to support the closure certification, and will be provided or accessible to Ecology on request:

- Field notes related to closure activities
- A description of deviations from the approved closure plan and justification for these deviations
- Documentation of the final disposition of dangerous wastes and dangerous waste residues, including contaminated media, debris, and treatment residuals

- Laboratory and field data (including quality assurance and quality control data) for samples and measurements, including those taken to determine background conditions or to determine or confirm clean closure
- A summary report that itemizes the data reviewed by the independent registered professional engineer and tabulates the analytical results of samples taken to determine or confirm clean closure

A draft decontamination documentation checklist and an example closure certification statement are provided in Figure 11-5 and Figure 11-6, respectively.

11.4.2 Run-on and Run-off Control

No runoff or run-on resulting from precipitation or surface water flows is anticipated in the areas undergoing closure. The WTP dangerous waste management units are enclosed within highly secure reinforced concrete and steel frame buildings, with the exceptions noted below. Wash water or other liquids resulting from decontamination activities will be contained by WTP containment structures - floors, walls, ceilings, sumps, and catch tanks.

The only units that may be exposed to direct precipitation are the two process condensate vessels outside the Pretreatment Building. The miscellaneous dangerous waste, central waste, and two melter storage buildings are separate freestanding units, and run-on or runoff control must be assured for these units before and during operation of the WTP, as well as during the closure period. There will be no changes in the containment capacities or runoff control design for these units during closure activities.

Activities such as groundwater monitoring and run-on and run-off control will be described in a revision to the closure plan prior to closure.

11.4.3 Equipment Reuse

Equipment may be decontaminated and reused during or after closure, if practicable. For example, contaminated material and handling equipment such as melter cave containment and shield doors, cranes, and power manipulators may be decontaminated in order to reduce radiation dose rates. This will allow initial or repeated personnel entry to areas where additional decontamination, debris size reduction, or packaging and encapsulation activities will be conducted. Equipment described in Sections 11.3 and 11.6 will be decontaminated using methods selected from those specified under 40 CFR 268.45, or equivalent technologies.

Criteria for determining whether equipment will be reused or disposed of include the following:

- Degree of contamination
- The need to minimize potential worker radiation and dangerous waste exposures during decontamination; the amount of decontamination residues that would be generated
- The value of the equipment
- Compliance with the approved schedule and budget

Equipment that could be used by DOE in future operations at the WTP site, in other Hanford projects, or at different DOE facilities, may be decontaminated first.

11.5 MAXIMUM WASTE INVENTORY (I-1c)

The estimated maximum mixed-waste inventory for each type of waste management unit is listed in Table 11-1. These are total storage capacity volumes from the WTP Part A form in Chapter 1 of the Dangerous Waste Permit Application.

The actual volumes present at the start of the closure period will be much less than values shown in the table. For example, the containment buildings and container storage areas may be empty or nearly empty on the date of completion of treatment of the final volume of waste feed, and the tank systems are not likely to contain more than a few percent of the maximum capacity.

11.6 CLOSURE OF TANKS, CONTAINER STORAGE, CONTAINMENT BUILDINGS, AND MISCELLANEOUS UNITS (I-1d)

This section of the closure plan identifies specific closure requirements for each type of unit at the WTP, and describes the removal of wastes and equipment, decontamination of the unit, and disposition of decontamination residues. A summary of the closure standards and activities for each type of unit is provided in Table 11-2.

The performance standards and closure activities for many of the unit components are similar or identical for the four types of units, as indicated in the table. Differences in the detailed closure procedures will be due in part to variations in unit design, and different ancillary equipment present in various units, even in units of the same type. Differences in procedures are also mandated by great variations in radiation dose rates in different units. In the HLW melter cave and most tank secondary containment areas, initial decontamination activities will be performed remotely, while the same types of activities may be performed by personnel in most of the other container storage units.

An overall estimate of the volume of closure wastes to be generated has not been prepared, due to the uncertainties regarding final disposition of the WTP equipment and structures. The estimate of the volume of closure wastes will be provided in an amended closure plan and submitted for approval prior to initiating closure activities. The volume of wastes that will be generated may be relatively large if most of the tanks, piping and related equipment, and major portions of the concrete and steel structures are removed and disposed of as waste. Volume of wastes may also be large if the same equipment and structures are completely decontaminated, resulting in large amounts of secondary residues, personnel protective equipment, and decontamination solutions. The volume of immobilized waste that will be generated during the closure period depends in part on the composition of the final batch of waste feed, which cannot be predicted at this time.

11.6.1 Closure of Tank Systems

Tank systems will be decontaminated using chemical and/or physical extraction technologies. Types of tank systems that will be decontaminated include, but are not limited to:

- LAW and HLW feed and storage tank systems
- Evaporators and condensers
- Waste filtration tanks
- Ion exchange tanks
- Condensate tanks

Types of ancillary equipment which may be decontaminated include, but are not limited to the following:

- Waste transport, rinse, and washdown piping
- Pumps, agitators, wash rings, and ejectors
- Air, steam, and water lines in secondary containment areas
- Intra-facility pipelines

Decontamination of tank systems including tanks, piping and other ancillary equipment will be conducted using chemical extraction technology and water washing and spraying. High-pressure steam or other physical extraction technologies identified in Section 11.3.3 will also be used to remove contamination if necessary. The decontamination procedures for closure of tanks will include, but may not be limited to, the following:

- Tank systems will be flushed after the final batch of bulk waste has been processed through that tank system. Large-volume flush solutions will remove as much waste as possible before smaller scale decontamination work begins. Flush water will be transferred to the Pretreatment evaporation and ultrafiltration systems, and the concentrates will be sent to the HLW melter for vitrification, if the HLW vitrification system is operating. (If either or both vitrification systems will not be operating during the first phase of the closure period, this closure plan will be revised to account for changes in treatment and disposal of waste feed and flushing wastes, as necessary.) Water condensate from the evaporator will be routed to the LERF/ETF. The HLW melter will be shut down after flushing wastes are treated. Tank decontamination activities to be performed after completion of flushing may involve any of the chemical or physical extraction technologies identified in Section 11.3.3. Used decontamination solutions will be transferred to the LERF/ETF or another permitted TSD facility.
- Physical evidence of contamination in the containment systems may be used, in addition to the operating record, to determine whether decontamination of the exterior of a tank system is needed. Before using decontamination solutions on the outside of a tank, the floor and wall liners will be inspected for cracks or other breaches. The cracks will be sealed before beginning decontamination treatment, or other engineered containment devices (such as

collection basins) will be used to collect and contain solutions. The outer tank surface then will be cleaned with water or detergents, or other technologies as necessary, and rinsed. Decontamination of secondary containment of these units will be similar or identical to the procedures used for container storage and containment building units.

- After the tanks are decontaminated, the tank interiors may be inspected using CCTV cameras to determine compliance with the clean debris surface standard. Because of possible radiation exposure, visual inspection of the process cells may be performed remotely using a camera with a zoom lens, or using another device that allows verification that the standard is met. Inspections will be documented in an inspection record.
- The outside of the tanks also will be inspected for compliance with the clean debris surface standard, and inspections will be documented in an inspection record.
- If tanks or ancillary equipment cannot be determined by visual inspection to meet the clean debris surface standard, the tanks may undergo further decontamination, or rinsate samples may be obtained to determine if the decontaminated tank meets the designation limit performance standard for clean closure. Before or after decontamination efforts, a tank system may be designated as dangerous waste, removed, reduced in size, packaged, treated by encapsulation, and sent to a permitted disposal facility.
- Decontamination residues will be collected, designated, and transferred to a permitted disposal facility.

The decontamination procedures for piping and ancillary equipment will include, but will not be limited to, the following activities:

- The facility design and process information, in combination with operating records, will be used to identify the equipment associated with mixed waste and mixed-waste constituents. Piping that may have carried mixed waste or may have become externally contaminated with mixed or dangerous waste will undergo decontamination. Contaminated piping may include waste transfer piping, sump contents transfer piping, nitric acid transfer piping, and other piping associated with waste treatment and secondary waste transfer.
- The piping will undergo bulk flushing at the same time the tanks are flushed. Flushing of the pipes and other ancillary equipment will remove the bulk volumes of waste, leaving adhered or attached quantities of waste.
- Chemical and/or physical extraction technologies may be used to attempt to remove the remaining waste from piping and other ancillary equipment. Where it is not possible to visually verify that the clean debris surface standard has been met, verification may be attempted by rinsate sampling, analysis, and comparison of analyses with designation limits.
- If it is not possible to meet the clean debris surface standard or designation limits, contaminated portions of the piping and ancillary equipment will be removed, designated as dangerous waste, packaged in waste containers, transferred to the CWC or another permitted unit, encapsulated, and disposed of at a permitted landfill disposal unit on the Hanford Site. Encapsulation may be performed at the CWC or elsewhere.

11.6.2 Closure of Container Storage Areas

Each unit will be evaluated for historical spills or other releases of dangerous or mixed wastes, by review of the facility operating record and by visual inspection. If the record review and inspection support the conclusion that no releases of waste to the floor occurred, no further decontamination or sampling work will be required for that unit. If either the inspection or record review indicate that waste releases to the floor of a unit occurred, decontamination will be required. If the protective coating is intact, chemical extraction treatment may be performed. If the coating is cracked or more severely damaged, physical extraction treatment will be required to remove at least 0.6 cm from the original surface. If the extent of the historical releases (the actual location on the floor) cannot be determined, the entire floor surface will be treated. If the resulting surface cannot be documented as a clean debris surface, the treatment may be repeated, or the full thickness of the floor may be removed. The solid residues or rubble produced by treatment or removal will be disposed of as dangerous waste, unless sampling and analyses are performed to support a request for an Ecology determination that the rubble is not dangerous waste.

The presence of through-thickness cracks or other loss of integrity, if found in concrete floors that rest directly on soil, in units where releases are documented or suspected, may require a soil contamination investigation. Examples of adequate evidence that a release may have occurred include discoloration or staining of the concrete, odor, or elevated radiation readings observed during the initial closure inspection. Soil and possibly concrete samples will be obtained by coring in the vicinity of known or suspected waste releases. Soil contaminated at concentrations above the risk-based soil cleanup levels will be removed, and confirmation samples will be taken at the limits of the excavation to confirm adequate removal. If analyses are less than the Hanford soil background levels but greater than the risk-based soil cleanup concentrations, a request for approval of a clean closure-determination will be submitted to Ecology. The request will be supported with the analytical and other pertinent data for that unit.

If soil contamination is so extensive that the zone of contamination cannot be practically removed, or if groundwater contamination could result, the closure plan will be revised to provide for additional investigation and measures to address corrective action requirements.

Decontamination documentation will be prepared as described in Sections 11.3.4 and 11.4.1.

11.6.3 Closure of Containment Building Units

One containment building unit, the pretreatment plant containment building unit, will be used for decontamination, size reduction, and packaging operations throughout the operating life of the WTP. It may be used for these same functions during the closure period. The HLW melter (cave) containment building may be used for similar operations during closure, after the normal melter operations have been completed. In particular, the HLW melter containment building may be used to partially decontaminate and overpack failed HLW melters that were stored in the out of service melter storage building during the operating life of the plant.

After completion of operations to facilitate closure of other units, the melters and associated spent parts, feed apparatus, and off-gas control equipment will be removed. The containment buildings will be closed in the same manner, following the same inspection, decontamination, and documentation requirements identified in Sections 11.6.1 and 11.6.2 for tank system containment areas and container storage units. Several significant differences in design and waste types will result in substantially longer time requirements for closure of the units, as compared to container storage units. For example, most operations in the HLW melter cave will be conducted with remotely operated equipment, until the final decontamination stages are reached. The ILAW container finishing line and container fixative units are also larger and contain more equipment than most of the container storage units. Complex remote operations are necessarily slow, and the full extent of necessary decontamination, size reduction, and packaging work will not be known until the final stages of closure.

Other containment building units are more similar to container storage units, including coated concrete rather than cladded floors and walls. These containment buildings will be closed in the same manner as the container storage units (Section 11.6.2), with the added complications of various types of waste handling equipment such as power manipulators, cranes, and the LAW LSM units.

11.6.4 Closure of Miscellaneous Units

The HLW and LAW melters are miscellaneous units. Several times during the life of the WTP, out of service melters will be removed from the HLW melter cave and LAW LSM gallery containment buildings, and may be placed in the melter container storage units. Removal and replacement of out of service melters is not considered closure. One or more of the LAW melters may actually be removed and not replaced, before the start of the closure period. The HLW melter is planned to be operating during the deactivation period (the first part of the closure period). If necessary, the HLW melter may be removed and replaced during the closure period to provide treatment for the residues from tank system flushing operations. Such removal and replacement would not be considered closure, although it may occur during the closure period.

LAW melter operating equipment openings will be closed and the exterior surfaces decontaminated. Then the melters will be removed from the LAW melter gallery as intact assemblies, encapsulated, and shipped to the LLBG or another permitted disposal unit. Melters may be stored in the melter storage buildings during the closure period, while treatment, transport, and disposal operations are arranged. HLW melters may be partially decontaminated and packaged in an overpack in the HLW melter cave during the final phases of closure activities. HLW melters in a melter storage building may be returned to the HLW melter cave for partial decontamination and packaging. Both types of melters will be treated in accordance with the immobilization treatment standard and disposed of at permitted mixed-waste disposal facilities.

Removal of melter components will be accomplished according to standard procedures for the operational period of the plant. Special HLW melter closure activities such as size reduction, decontamination of components, or packaging of components and decontamination residues,

may require the development of new procedures or the installation of new equipment. These activities cannot be fully predicted at the current stage of design, and some uncertainties will remain even at the start of the closure period.

The encapsulation treatment design is still under development. Additional information will be provided in this section, before the start of closure. Information to be provided includes details of encapsulation treatment locations, equipment, and materials.

11.7 SCHEDULE FOR CLOSURE (I-1f)

For the purposes of this dangerous waste permit application, the design life of the WTP is estimated at 40 years of operations. The estimated three-year schedule for closure is provided in Figure 11-7.

Regulations require that Ecology be notified at least 45 days before the start of the closure period. In addition, the closure period must begin within approximately 30 days after completion of treatment of the final waste feed transfer from the DST system unit. Due to the complexity of the WTP operations, these requirements will likely be unable to be met. Additional evaluation of the schedule will be conducted prior to closure.

The date of receipt of the final volume of bulk waste feed in the melters, and various other specific individual units within the WTP, will be at the end of the processing of that final batch of waste feed. This date will roughly correspond to the date of the start of deactivation operations. The Pretreatment plant and HLW feed preparation and melter systems will continue to operate for several months after the start of the closure period. The plants will be processing the tank system flush solutions and producing immobilized waste glass containing most of the residual waste constituents left in the tanks at the start of the closure period.

The year the WTP closes will depend on the time required for the initial portion of the tank waste inventory to be processed, the degree of success in this mission, and whether the WTP will be used to continue to process the remaining Hanford tank waste inventory. Other factors that could affect the year of closure include changes in operational requirements, lifetime extension upgrades, a different operating contractor, and other unforeseen factors.

This estimated three-year closure schedule is necessarily general, and is not meant to be definitive. For example, completion of decontamination of the pretreatment building and residue removal is shown at approximately 13 months after the start of the closure period. However, decontamination of the LAW and HLW vitrification plant tanks and other units is expected to require use of pipelines through the Pretreatment plant to transfer decontamination solutions and rinsates to the LERF/ETF. Therefore, the final decontamination of piping and collection tanks in the Pretreatment building may not be completed until after the LAW and HLW vitrification plant tanks and other units are decontaminated.

A more specific schedule will be provided in the revision of this closure plan prior to the start of closure activities. The revised schedule will take advantage of final design and operating procedure information that is not available at this time. The schedule for closure will include a

breakdown of activities to be performed after the date of completion of vitrification processing of the last batch of waste feed from the DST System unit.

11.8 EXTENSION FOR CLOSURE TIME (I-1g)

The following discussion addresses the extension of the waste removal and closure time periods, as specified in WAC 173-303-610(4)(a) and (b), respectively. The first citation requires that within 90 days after receiving the final volume of dangerous waste (the DST waste), the owner or operator must treat, remove from the unit, or dispose of all dangerous wastes in accordance with the approved closure plan. The second requirement is that all closure activities must be completed within 180 days after receiving the final volume of dangerous waste.

The need for more than 90 days to remove wastes and more than 180 days to complete closure activities is anticipated. This is due in part to the high radiation fields in many of the waste management units, even after the entire bulk waste inventory has been processed and the residues (the inventory present at the start of the closure period) are removed by flushing. Processing of the final batch of waste feed may require approximately nine months of operation at or near design capacity of the plant, prior to the start of deactivation and closure work. As explained in Section 11.7, these processing operations will be completed, or nearly completed, at the start of the closure period.

Small volumes of waste residues may still exhibit extreme radioactivity and hazardous radiation dose rates. This fact will require much of the closure work to be performed, of necessity, by remotely operated equipment. The large number of units and extensive integrated ancillary equipment such as piping, valves, filters (mostly welded together), and the need to coordinate closure activities with other TSD units both at Hanford and offsite, means that more time will be required for closure than would be necessary for a typical dangerous waste management facility.

The decontamination operations described in this closure plan are intended to avoid excessive secondary waste generation and to provide for the recycling of some pieces of equipment. The decontamination operations will include extensive use of chemical and physical decontamination treatment technologies. Incineration is not considered as an option for wastes to be generated during closure. Solidification, encapsulation, and land-filling of dangerous and mixed wastes will be deliberately minimized. The volumes of wastes that will be disposed of will also be minimized to the extent practical by physical size reduction. Size reduction will allow packaging of large tanks, pipe, and support structures in relatively small, densely packed drums or waste boxes. These waste management priorities are emphasized to support this request for extension of the waste removal and closure periods, as suggested in Section 4.1 of the Ecology *Guidance for Clean Closure of Dangerous Waste Facilities* (Ecology 1994c).

The WTP operator will take the actions necessary to prevent threats to human health and the environment from the unclosed but not operating WTP, including compliance with applicable permit requirements. During the first several months of the closure period, a large portion of the plant will be operating to remove waste residues from the tank systems to the maximum practical extent. Flushing, vitrification, and other deactivation activities will require continued security

and monitoring of the other non-operating portions of the plant, and no part of the plant will be unsecured or abandoned during the closure period.

If necessary, an extension of the three-year closure schedule will be requested and the need for the extension demonstrated in accordance with WAC 173-303-610(4)(a) and (b). The request would be determined prior to initiating closure activities, or during closure activities should closure conditions necessitate. A revised closure plan will be submitted for approval if an extension is necessary.

Condition II.X.1 of the Hanford Facility RCRA Permit (DW Portion)(Ecology 1994a) requires the Permittees to notify Ecology in writing, as soon as possible, of deviations or expected deviations from the schedules of the Permit. The Permittees shall include with the notification information supporting their claim that they have used best efforts to meet the required schedules. If Ecology determines that the Permittees have made best efforts to meet the schedules of the Permit, Ecology shall notify the Permittees in writing by certified mail that the Permittees have been granted an extension. Such an extension shall not require a permit modification under Condition I.C.3. Should Ecology determine that the Permittees have not made best efforts to meet the schedules of the Permit, Ecology may take such action as is deemed necessary. Copies of correspondence regarding schedule extensions shall be kept in the operating record.

Condition II.X.2 of the Hanford Facility RCRA Permit (DW Portion) provides that any schedule extension granted through the approved change control process identified in the *Hanford Federal Facility Agreement and Consent Order* (Ecology, EPA, and DOE 1998) shall be incorporated into the Permit. Such a revision shall not require a permit modification under Condition I.C.3.

11.9 CLOSURE COST ESTIMATE (I-1H)

TSD facilities located at the Hanford Site are exempt from the closure cost estimate requirements of WAC 173-303-620, in accordance with Condition II.H.3 of the Hanford Facility RCRA Permit (DW Portion). However, Condition II.H.1 of the Hanford RCRA Permit (DW Portion) requires submittal of an annual report updating projections of anticipated costs for closure.

The projection of anticipated costs will be based on the closure activities described in Sections 11.3 and 11.4. The projection of anticipated costs will be submitted during the first October following commencement of mixed waste processing. The cost projection will be updated annually, in accordance with Condition II.H.1 of the Hanford Facility RCRA Permit (DW Portion).

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Table 11-1 Maximum Waste Inventory

Waste Management Unit	Maximum Inventory [a]
Total container storage	1,840,000 gal
Total tank storage	4,735,000 gal

[a] Miscellaneous (melter) and containment building units are not counted, as they will be processing the volumes previously stored in tanks, and producing treated and secondary wastes that are included in the container storage total.

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Table 11-2 Clean Closure Performance Standards and Activities

Unit Type	Components	Performance Standards	Closure Activities
Tank system	Exterior surfaces Interior surfaces Ancillary equipment Secondary containment	Clean debris surface, designation limits, or removal	Extraction technologies or removal of tanks Liner and concrete decontamination and/or removal
Container storage area	Floor, walls, and ancillary equipment	Clean debris surface, designation limits, or removal	Extraction technologies Liner and concrete decontamination and/or removal
Containment building	Floor, walls, and ancillary equipment	Clean debris surface, designation limits, or removal	Extraction technologies Liner and concrete decontamination and/or removal
Miscellaneous (melter)	Melters and ancillary equipment	Removal	Removal

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Figure 11-1 Closure Strategy Flowchart for Tank Systems

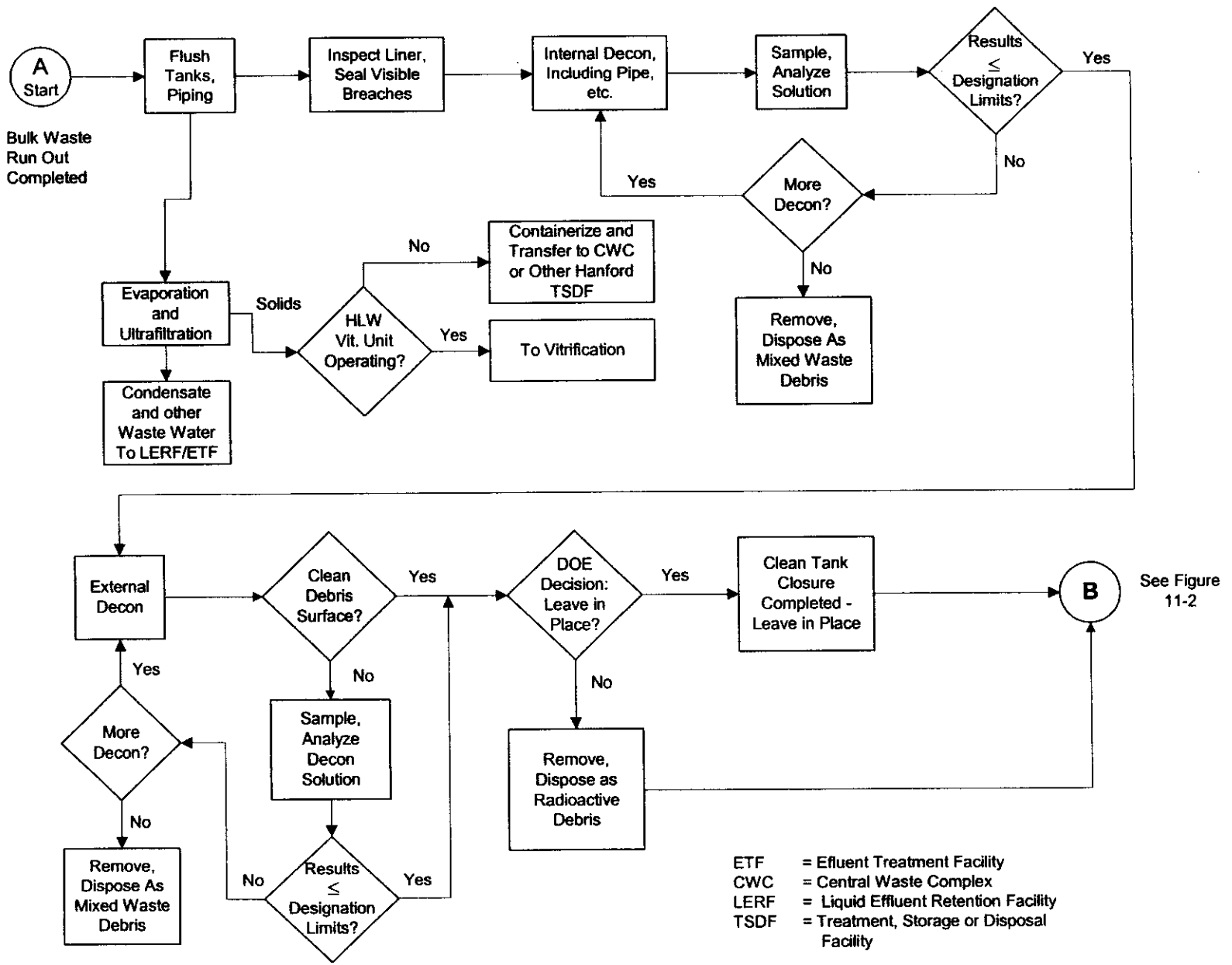

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Figure 11-2 Closure Strategy for Container Storage, Containment Building, Miscellaneous Unit, and Tank System Containment Areas

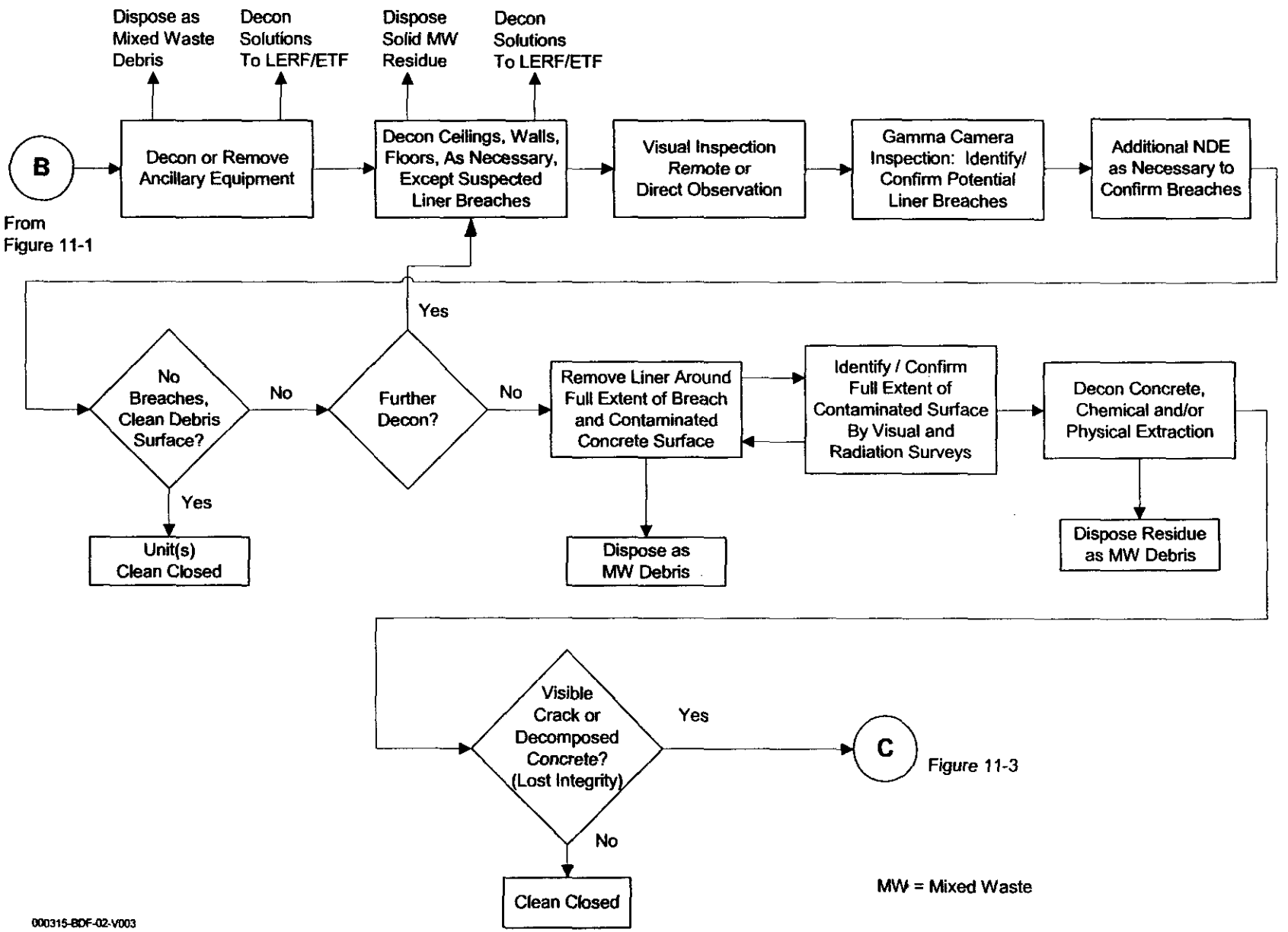

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Figure 11-3 Closure Strategy Flowchart for Soils and Groundwater

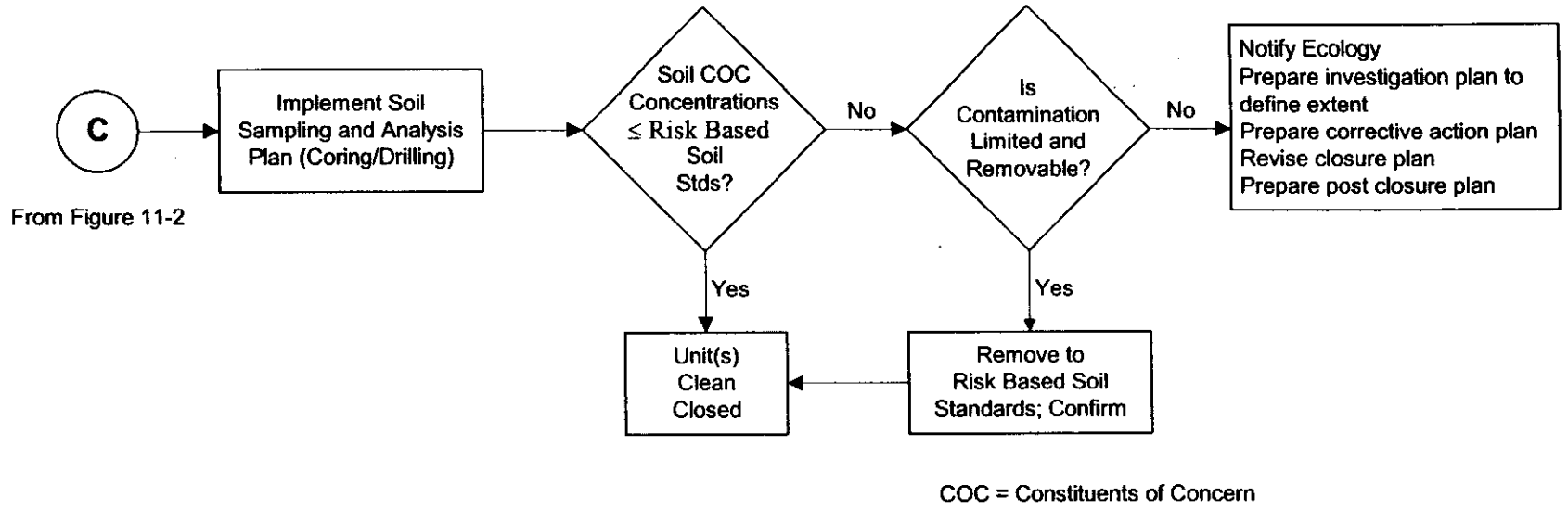

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Figure 11-4 WTP Permitting, Deactivation, and Closure

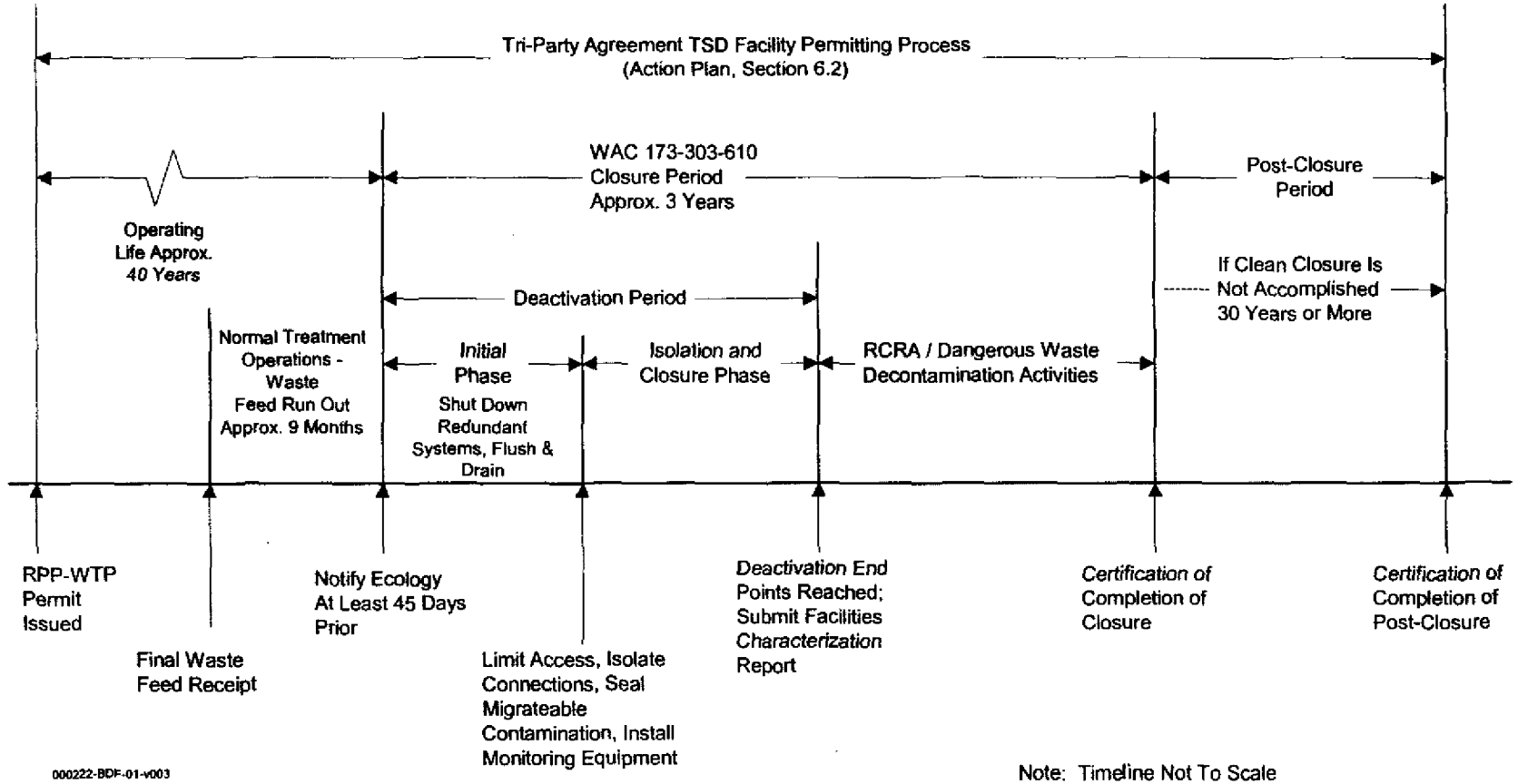

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Figure 11-5 Sample Clean Debris Surface Checklist

DECONTAMINATION CHECKLIST

This checklist is intended to document decontamination work and the attainment of a clean debris surface for the following components, structures, and materials.

1 Building or location:
2 *Component or Area:*
3 Material (such as concrete, metal):
4 Decontamination treatment method[1]:
5 Decontamination treatment parameters:
- Temperature
- Propellant
- Solid media (such as shot, grit, beads)
- Pressure
- Residence time
- Surfactants
- Detergents
- Grinding or striking media (such as wheels, piston heads)
- Depth of surface layer removal in cm (in concrete, for example)
- Other

The decontamination of the building, component, or material identified in steps 1 through 3 was completed as specified at steps 4 and 5.

Title	Signature	/ Date

6 Performance Standard:

I have visually inspected the above-identified material before / after (circle one) decontamination or treatment in accordance with the closure plan. Dangerous waste residues have / have not (circle one) been removed to attain a clean debris surface[2].

Authorized Representative	Signature	/ Date

Notes:

1 *Decontamination treatment will use a chemical or physical extraction method as listed in Table 1, Alternative Treatment* Standards for Hazardous Debris (40 CFR 268.45).

2 Clean debris surface as defined in Table 1, Alternative Treatment Standards for Hazardous Debris (40 CFR 268.45): "'Clean debris surface' means the surface, when viewed without magnification, shall be free of all visible contaminated soil and hazardous waste except that residual staining from soil and waste consisting of light shadows, slight streaks, or minor discolorations, and soil and waste in cracks, crevices, and pits may be present provided that such staining and waste and soil in cracks, crevices, and pits shall be limited to no more than 5 % of each square inch of surface area."

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1 **Figure 11-6 Example Closure Certification Statement**

CLOSURE CERTIFICATION
FOR

River Protection Project – Waste Treatment Plant
Hanford Site
US Department of Energy, Richland Operations Office

We, the undersigned, hereby certify that _____ closure activities were Performed in accordance with the specifications in the approved closure plan.

_____	_____ /	_____
Owner/Operator	Signature	Date
_____	_____ /	_____
Contractor Representative	Signature	Date
_____	_____ /	_____
Independent Registered Professional Engineer	Signature	Date

Washington State PE # _____

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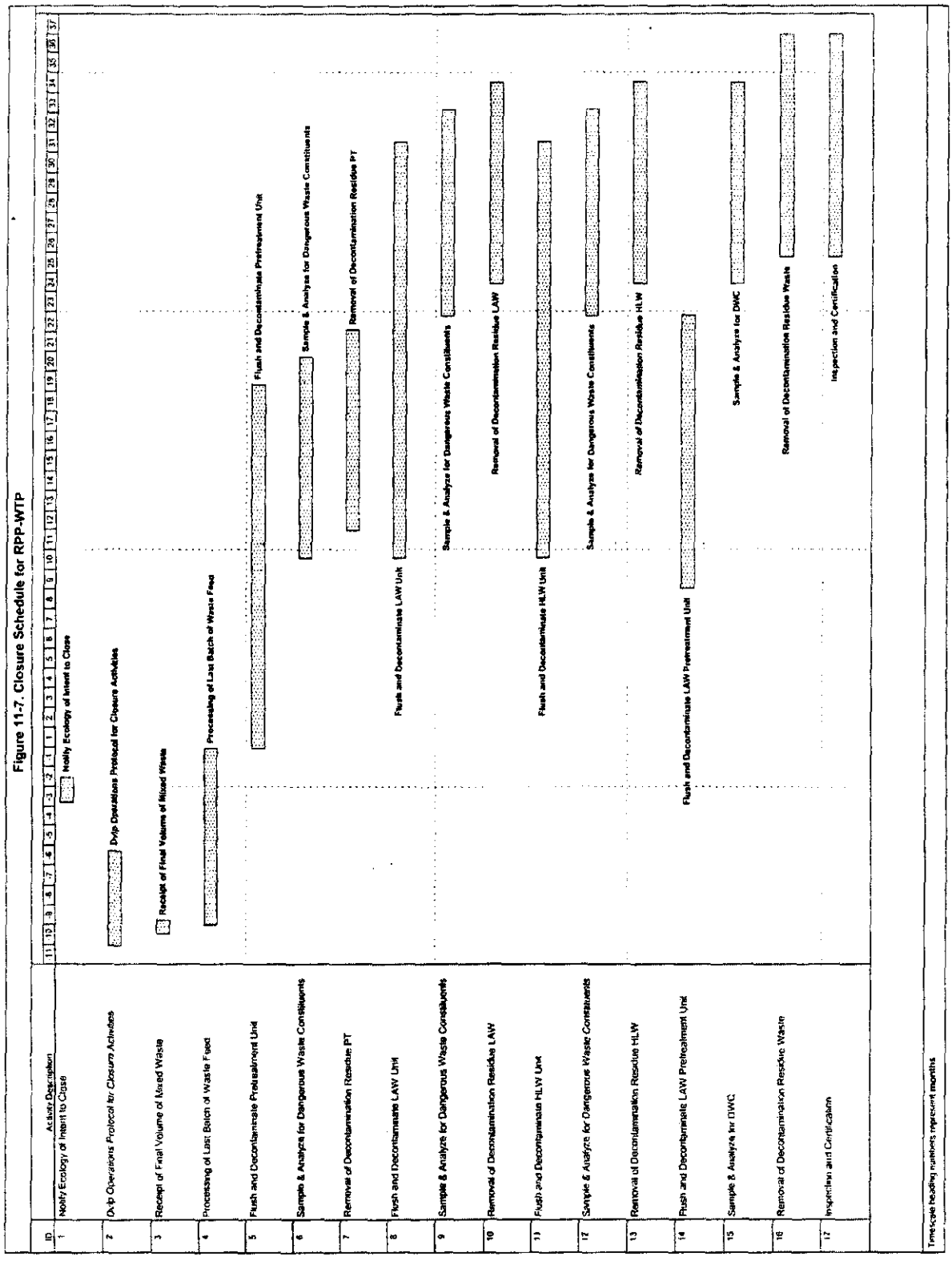
1 **Figure 11-7 Closure Schedule for WTP**



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Chapter 12.0

Reporting and Recordkeeping

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CHAPTER 12.0
REPORTING AND RECORDKEEPING

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12.0 REPORTING AND RECORDKEEPING

The River Protection Project - Waste Treatment Plant (WTP) is subject to the reporting and recordkeeping requirements of *Dangerous Waste Regulations* (WAC 173-303), *Standards for Owners and Operators of Hazardous Waste Treatment, Storage and Disposal Facilities* (40 CFR 264), and *Land Disposal Restrictions* (40 CFR 268).

Descriptions of specific reporting and recordkeeping requirements applicable to treatment, storage, and disposal units are located in the *Hanford Facility Dangerous Waste Permit Application, General Information Portion* (DOE-RL 1998). Not all of the requirements and associated reports and records identified in Chapter 12 of the General Information Portion apply to the WTP. Those that apply are as follows:

Reports and Records
Quarterly notification of Class 1 modification notification
Monitoring and records
Certification of construction or modifications
Anticipated noncompliance
Reporting planned changes
Immediate reporting
Release or noncompliance not requiring immediate reporting
Written reporting
Waste transfer documentation discrepancy report (equivalent to "Manifest Discrepancy Report")
Other information
Permit-related documentation
Notification of permit-related documentation
Waste location
Waste analysis
Contingency Plan and incident reports
Personnel training records

Reports and Records
Closure and postclosure cost estimates
Onsite transportation documentation
Annual noncompliance report
Annual dangerous waste report
Annual LDR report
Permit condition compliance evaluation
Deed notification (reference only)
Inspection records
Closure certification
Notification of, or request for, permit modification
Closure plan deviation
Engineering change notices and nonconformance reports
As-built drawings
Equivalent materials
LDR records
Schedule extensions

Reports and Records
Occurrence reports
Emergency Response Plan

Reports and Records
Waste minimization and pollution prevention
Other permit compliance documentation

The WTP facility operating record (Hanford Facility Operating Record) will be kept onsite or at the permittee's offices located in Richland, Washington.

Hanford Waste Treatment and Immobilization Plant Draft Permit

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Attachment 51 – Appendix 1.0
WTP Interim Compliance Schedule

	III.10.C.2	
1.	Submit documentation stating the WTP has been constructed in compliance with the Permit.	11/30/07
2.	Submit updated Site Transportation Report for incorporation into the Administrative Record.	12/31/03
	III.10.C.3	
3.	Revise and Submit Waste Analysis Plan and associated Quality Assurance Project Plan to Ecology for review and approval	08/12/05
	III.10.C.5.	
4.	Update and submit for approval "Procedures to Prevent Hazards", Chapter 6.0 Sections 6.3, 6.4, 6.5 and the Inspection Schedule.	08/01/06
	III.10.C.6	
5.	Update and submit the Contingency Plan	08/01/06
	III.10.C.7	
6.	Update and resubmit for review and approval Training Program description in Chapter 8 of the Permit.	08/01/06
7.	Submit under separate cover the actual WTP Dangerous Waste Training Plan for incorporation into Administrative Record.	08/01/06
	III.10.C.8	
8.	Update and resubmit the Closure Plan for approval	08/01/06
	III.10.C.11	
9.	Submit Risk Assessment Workplan, revised in consultation with Ecology.	02/03/03
	CONTAINERS	
10.	Submit detailed information associated with containers and container management areas	10/01/04
11.	Submit descriptions of container management practices	08/01/06
12.	Submit engineering information for each secondary containment and leak detection system for the WTP Tank System to be included in the permit	11/03/03
13.	Submit engineering information for each dangerous waste tank and primary sump to be included in the permit	05/01/04
14.	Submit engineering information for each tank system ancillary equipment to be included in the permit	05/01/04
15.	Submit descriptions of tank management practices	08/01/06
	CONTAINMENT BUILDINGS	
16.	Submit engineering information for each containment building to be included in the permit	02/01/04

Number	Description	Compliance Date
17.	Submit descriptions of containment building management practices	08/01/06
	PRETREATMENT PLANT MISC. UNITS SYSTEMS	
18.	Submit engineering information for secondary containment and leak detection system for the Pretreatment Plant Miscellaneous Unit Systems	09/16/03
19.	Submit engineering information for Pretreatment Plant Miscellaneous Unit Systems	10/01/04
20.	Submit engineering information for Pretreatment Plant Miscellaneous Unit Systems equipment	10/01/04
21.	Submit descriptions of management practices for the Pretreatment Miscellaneous Treatment System	07/01/07
	LAW SHORT TERM MELTER UNIT	
22.	Submit engineering information for LAW Vitrification Miscellaneous Treatment Unit secondary containment	03/01/04
23.	Submit engineering information for LAW Vitrification Miscellaneous Treatment Unit sub-system	05/01/04
24.	Submit engineering information for equipment for each LAW Vitrification Miscellaneous Treatment Unit sub-system	05/01/04
25.	Submit descriptions of management practices for the LAW Vitrification Miscellaneous Treatment System	08/01/06
26.	Submit LAW Vitrification Environmental Performance Demonstration Test Plan for Ecology review and approval	08/01/06
	HLW SHORT TERM MELTER UNIT	
27.	Submit engineering information for HLW Vitrification Miscellaneous Treatment Unit secondary containment	03/01/03
28.	Submit engineering information for HLW Vitrification Miscellaneous Treatment Unit sub-system	08/01/03
29.	Submit engineering information for equipment for each HLW Vitrification Miscellaneous Treatment Unit sub-system	08/01/03
30.	Submit descriptions of management practices for the HLW Vitrification Miscellaneous Treatment System	01/02/07
31.	Submit HLW Vitrification Environmental Performance Demonstration Test Plan for Ecology review and approval	01/02/07
32.	Final Compliance Date	12/31/07

Note: Interim compliance dates can be changed by following the permit modification process in WAC 173-303-830. Changes to interim compliance dates are classified in WAC 173-303-830 (Appendix 1) as Class 1 modifications and require Ecology approval.

Attachment 51 – Appendix 2.0
Critical Systems for the WTP

Mnemonic System Locator	System Name
PFH	Pretreatment Filter Cave Handling System
PJV	Pulse Jet Ventilation System
FRP	Waste Feed Receipt Process System
FEP	Waste Feed Evaporation Process System
TLP	Treated LAW Evaporation Process System
TCP	Treated LAW Concentrate Storage Process System
HLP	HLW Lag Storage and Feed Blending Process System
UFP	Ultrafiltration Process System
CXP	Cesium Ion Exchange Process System
CNP	Cesium Nitric Acid Recovery Process System
TXP	Technetium Ion Exchange Process System
TEP	Technetium Eluant Recovery Process System
CRP	Cesium Resin Addition Process System
TRP	Technetium Resin Addition Process System
RDP	Spent Resin Collection and Dewatering Process System
PIH	Pretreatment In-Cell Handling System
RSH	Spent Resins Solid Handling System
RWH	Radioactive Solid Waste Handling System
RLD	Radioactive Liquid Waste Disposal System
NLD	Non–Radioactive Liquid Waste Disposal System
PVP	Pretreatment Vessel Vent Process System
PWD	Plant Wash and Disposal System
C3V	C3 Ventilation System
C5V	C5 Ventilation System
PVV	Process Vessel Vent System
RWH	Radioactive Solid Waste Handling System
RLD	Radioactive Liquid Waste Disposal System
NLD	Non-Radioactive Liquid Waste Disposal System
C3V	C3 Ventilation System
C5V	C5 Ventilation System

LCP	LAW Concentrate Receipt Process System
LFP	LAW Melter Feed Process System
LMP	LAW Melter Process System
LOP	LAW Primary Offgas Process System
LVP	LAW Secondary Offgas/Vessel Vent Process System
LSH	LAW Melter Equipment Support Handling System
LRH	LAW Container Receipt Handling System
LPH	LAW Container Pour Handling System
LFH	LAW Container Finishing Handling System
LEH	LAW Container Export Handling System
PJV	Pulse-Jet Ventilation System
HCP	HLW Cave Receipt Process System
HFP	HLW Melter Feed Process System
HMP	HLW Melter Process System
HOP	Melter Offgas Treatment Process System
HSH	HLW Melter Cave Support Handling System
HFH	HLW Filter Cave Handling System
HRH	HLW Canister Receipt Handling System
HPH	HLW Canister Pour Handling System
HDH	HLW Canister Decontamination Handling System
HEH	HLW Canister Export Handling System
HMH	HLW Melter Handling System
RWH	Radioactive Solid Waste Handling System
RLD	Radioactive Liquid Waste Disposal System
NLD	Non-Radioactive Liquid Waste Disposal System
C3V	C3 Ventilation System
C5V	C5 Ventilation System
RWH	Radioactive Solid Waste Handling System
RLD	Radioactive Liquid Waste Disposal System
NLD	Non-Radioactive Liquid Waste Disposal System

Attachment 51 – Appendix 3.0
Drawing Categories

FACILITY (Civil, Structural, & Architectural)
Detail Drawings
Finish Schedules
Floor Plans, Elevations
Penetration Seals
Circulating Water
Civil Drawings
Concrete Drawings
Embed & Penetration
Liner Plate
Site Plan Civil
Yard/Underground Piping

SYSTEM (Controls)
Computer I/O
Vendor Documents

FACILITY (Controls)
Instrument Location

SYSTEM (Electrical)
Cathodic Protection
Single Line
Diesel Generator Load List

FACILITY (Electrical)
None

SYSTEM (Mechanical)
Equipment List
Flow Diagrams
Energy Balances
Piping & Instrumentation Diagrams
Mechanical Systems Assemblies
Heavy Load Path Drawings

FACILITY (HVAC)
Ventilation & Instrumentation Diagrams
Performance/Installation Specifications
System Description
Vendor Drawings

FACILITY (Plant Design)
Equipment Location
General Arrangement/Plot Plan
Piping Isometrics
Piping Orthographics
Piping Supports (Incl. Steel)
Plumbing and Drains
Pipe Specifications
Piping Class Sheets

SYSTEM (Fire Protection)
Fire Barrier/Zone Drawings
Fire Protection General Layout
Fire Alarm General Layout

SYSTEM (Process)
Hydrotest Diagrams
Line Designation Tables
Material Balance
Process Equipment Datasheets
Process Flow Diagrams
Utility Flow Diagram

FACILITY (Mechanical Handling)
Mechanical Flow Drawings
Mechanical Sequence Diagram
Design Proposal Drawing
Equipment General Arrangement
Equipment Detail Drawings

Attachment 51 – Appendix 4.0
Piping Material Index Table

(RESERVED)

Attachment 51 – Appendix 5.0
Legends for Process Flow Diagrams and Piping and Instrumentation Diagrams

(RESERVED)

Attachment 51 – Appendix 6.0
Risk Assessment

Citing national security concerns, the US Department of Energy requested that topographic maps and site plot plans not be distributed in electronic form. They are available for viewing at the following public information repositories.

Public Information Repositories

Portland
Portland State University
Branford Price Millar Library
934 SW Harrison and Park
Portland, Oregon 97207
(503) 725-3690
E-mail: bowman@lib.pdx.edu

Richland
USDOE Public Reading Room
2770 University Drive
Consolidated Information Center, Rm. 101L
Richland, Washington 99352
(509) 372-7443
E-mail: reading_room@pnl.gov

Spokane
Gonzaga University
Foley Center
East 502 Boone
Spokane, Washington 99258
(509) 323-3839

Seattle
University of Washington Suzzallo Library
Government Publications Division
Seattle, Washington 98195
(206) 543-4664
Attn: Eleanor Chase
E-mail: echase@u.washington.edu
Public Service: (206) 543-1937

Administrative Record

Richland
Public Access Room
2440 Stevens Center, Room 1101
P.O. Box 950, Mail Stop H6-08
Richland, WA 99352
(509) 376-2530
Debra_A_Debbi_Isom@rl.gov

Attachment 51 – Appendix 7.0
(RESERVED)

Attachment 51 – Appendix 8.0
Pretreatment Building

(RESERVED)

Attachment 51 – Appendix 9.0
LAW Building

(RESERVED)

Attachment 51 – Appendix 10.0
HLW Building

(RESERVED)

Attachment 51 – Appendix 11.0
Laboratory Building

(RESERVED)

Attachment 51 – Appendix 12.0
Balance of Facilities

(RESERVED)